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AGRICULTURAL CHEMICALS



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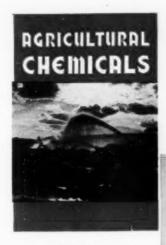


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VOL. VI No. 12 DECEMBER 1951.

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AGRICULTURAL CHEMICALS

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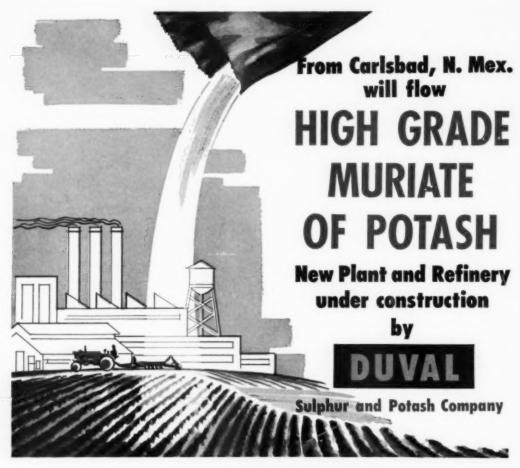
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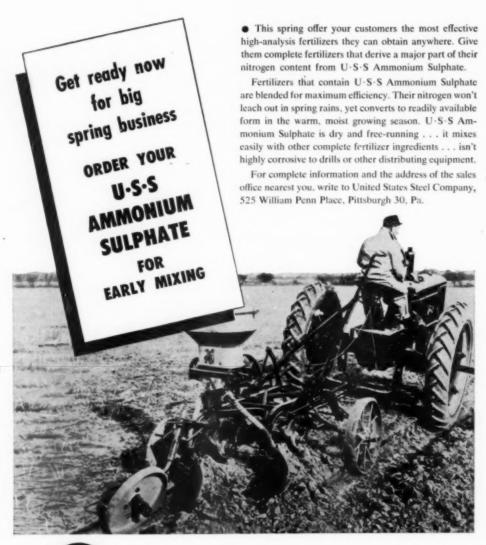
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THE EDITOR COMMENTS



PEAKING at the United Nations Food and Agriculture Organization meeting in Paris a few weeks ago, Secretary of Agriculture Charles F.

Brannan stated that U. S. agricultural production for 1951 would be the highest ever achieved and would run about 40 percent above the 1935 to 1939 average. He predicted that in 1952, agricultural production in the U. S. would "surpass even the current year's all-time high levels."

Such an assignment of an even greater crop yield for 1952 makes the pesticide and fertilizer industries wonder how their production can be greatly increased to make possible the promised stepped-up production of agricultural commodities. Last year the pesticide industry produced more than a billion pounds of materials and the fertilizer industry perhaps twenty million tons as their contributions to 1951's record yield. The supply picture is called "generally; good" for 1952, but we can't forget that there is less sulfur for agriculture; and that hits both the fertilizer and pesticide industries.

There is also the question of whether steel drums will be available in the large quantities needed for millions of gallons of pesticides; and whether railroad cars will be on hand to transport the materials to places where needed, and at the time when needed. This of course should re-emphasize the necessity of ordering pesticide supplies soon as possible, to avoid delay.

Agricultural production at its record pace of the past few years has been achieved to a great extent through the use of chemicals as well as through improved cultural methods and mechanical helps. All these factors have to work together, of course, but the point is that U. S. agricultural production won't "surpass even the current year's...level" unless the agricultural chemical industry is able to get the raw materials it must have to allow its ample facilities to produce at full capacity. Given the raw materials, the industry will help Secretary Brannan to keep his promise that 52's production will top this year's record.



GAINST the too frequent reports heard about DDT's being the cause of all sorts of human ills ranging from nervousness to cancer, comes

a calm but significant statement on the subject by two eminent scientists. In a joint statement issued November 19 by the Illinois State Department of Public Health and the Illinois Natural History Survey, the point was made that although both agencies have long warned against use of DDT where milk is produced or processed, the insecticide is still recommended highly for control of mosquitoes and other destructive insects.

The authors of the statement, Dr. Roland R. Cross, State Health Director and Harlow R. Mills, Chief of the Natural History Survey, in reviewing their former endorsement of the U. S. Department of Agriculture's recommendation of methoxycl·lor for control of flies in all phases of dairying, declared that "Our statement at that time in no manner implied that DDT might not be used with safety for other insect control." On the contrary, they went on, "To abandon the use of DDT and other valuable insecticides would subject people to an inadequate and unbalanced diet due to crop loss and disease epidemic far more serious than any we now know. We should not be concerned so much with whether DDT or other insecticides should be used," they concluded, "but should concentrate upon using the right insecticide at the right time, in the right place and in the right way."

As State Health Director, and thus responsible for the general health of the people of his state, Dr. Cross' statement regarding the safety of DDT carries a considerable amount of weight. While others of smaller responsibility and with much less authority are naming DDT as the source of great human suffering, it is refreshing to hear one more man of Dr. Cross' stature state what he knows to be true about DDT.

Agricultural Chemicals for 1952

by A. W. Mohr

President, California Spray-Chemical Corp., Richmond, Calif., and president, National Agricultural Chemicals Association



THE pesticide industry is becoming increasingly concerned over an apparent over-confident attitude among dealers and growers that pesticides in 1952 will be available in more than adequate supply. Considering the overall picture, this assumption is so far removed from the current estimate of the situation, that it presents many serious dangers.

Although the industry had a record production of over one billion pounds of material for the 1951 season, this was made possible only by the cooperative efforts of industry, government officials and the growers themselves. There are many factors which make this cooperation in the coming season even more important than ever.

The supply of pesticides for 1952 is of such concern that the Senate Agriculture Committee made an inquiry into the matter so that every opportunity could be used to protect agricultural production another year. The pesticides industry, through the National Agricultural Chemicals Association, submitted a paper to this committee, pointing out the necessity for many basic

chemicals and their importance to the national defense effort.

It is our belief that the production of food, feed and fiber is of such importance that chemicals will be made available in quantity to protect crops. But we must also recognize that the scramble for scarce basic materials and steel is such that the pesticides industry must compete with other industries producing materials of equal importance to the defense effort.

The current defense production period is expected to require greater quantities of scarce materials than previously, and since there are not enough of several basic chemicals to cover all requirements completely, the pesticides industry will necessarily have to accept its share of responsibility in doing the most possible with an inadequate supply.

The supply of sulfur is far from adequate and agriculture has been asked to use sulfur only where there is no alternative method of pest control. The use of sulfur in formulations of insecticides or sulfur as a fungicide is expected to be curtailed almost entirely during the ensuing season.

(Turn to page 95)

Recent British Developments in

Taint-Free Use of BHC

by

E. Holmes, Ph.D.

Plant Protection, Limited, London, England

LTHOUGH first publication of the insecticidal use of benzene hexachloride (BH-C) took place within the last decade, its exact history is not well known. Internal records at the Hawthorndale Laboratories, Jealott's Hill Agricultural Research Station in England, show that tests in 1937 proved it to be quite active, but this observation was neither published nor followed up. It was also tested with interesting results in France in the early years of World War II, but no distinction appears to have been noted between the insecticidal activities of the various isomers. Serious work began in England in 1942, when derris supplies were threatened by the Japanese, and in the following year it was becoming apparent that only the gamma isomer had really outstanding properties, as reported by Slade 1 in 1945.

Since that time the number and volume of the outlets for BHC have increased enormously, but the agricultural uses have been limited in many important directions by its liability, in some forms and under some conditions, to cause off-flavor, or "taint," in food crops. Isolation of substantially pure gammaBHC, (lindane), has helped not only by lowering the taint potential at a given level of insecticidal perfor-

mance, but by making possible new techniques of application.

We in Britain have developed the taint-free use of BHC in three main directions:-

(1) by developing gamma-BHC formulations.

(2) by using gamma BHC in new tech-

(3) by using even crude BHC for certain purposes according to a carefully timed schedule.

The Taint Problem

BEFORE considering these items in detail let us look a little more closely into the general problem of taint. BHC, or impurities contained in the technical grade, are capable of causing taint or a musty flavor in some crops. It has tended to become routine to ascribe any offflavor, particularly in potatoes, to BHC. BHC can and often does taint potatoes grown in soil treated with it; but it is not by any means the only culprit. Farmyard manure applied to potato soils can cause taint in dry seasons, at least in England, and the writer knows of several instances of complaint where potatoes had been grown in soils which have never been treated with BHC.

Distinction must also be drawn between two kinds of taint;

that due to the presence of BHC, its impurities or breakdown products, within a plant, and taint due to the presence of BHC on crops at harvest time. Some crops - potatoes, onions, perhaps carrots and certainly black currants - are capable, through their foliage or roots, of absorbing BHC, which afterwards remains and is translocated within the plants. Other crops · cereals, apples, plums, tomatoes, strawberries and mushrooms do not seem to absorb the chemical at all or, if they do, do not exhibit taint. It must be repeated, however, that if BHC applications to crops in this second list are so timed that BHC is still physically present on them at harvest time, then taint will occur. Timing must be such that normal weathering, including volatilization, will remove spray deposits before harvest.

There are other complicating factors involved in pursuing this subject:

 of any group of people attempting to differentiate between normal and tainted fruits or vegetables, about 40 per cent lack a critical palate and are quite incapable of distinguishing the two.

(2) some sorts of produce appear normal under some conditions, yet tainted under others: tainted potatoes, unless the tainting is very heavy, are not usually detected in the fried state, though most distasteful when boiled, and, (3) some fruits, peaches for example, may seem quite normal when eaten fresh or stewed, yet may develop taint after canning.

In Britain, the first field tests of BHC were carried out in 1942 and work on the taint problem started two years later. Results from seven years' work are thus available. Much of this work was carried out by specially selected "tasting panels" consisting of at least twelve workers, frequently more, and by methods capable of statistical analysis.

The methods of tasting now developed are very sensitive and, both at the Hawthorndale Laboratories already mentioned, and at our own Fernhurst Research Station, the flavor of test material is placed in one of five categories:-

Category A - normal,

B very slightly abnormal but palatable,

C - almost disagreeable,

D · definitely disagreeable and

E objectionable (inedible). It should be added that carefully planned tests in a canteen, in parallel with tests by the tasting panel on the same lots of potatoes, have shown that degrees of tainting can be detected by the panel that would pass unobserved in normal consumption. For example, canteen tests seldom detect anything abnormal until Category C is reached.

Crops Involved

ONE of the biggest uses of BHC in Britain is for the control of wireworms (Agriotes spp.) attacking cereals and sugar-beet, particularly in soils newly broken from old pasture (Jameson et alia) ^{2 3}. There is no record of cereals ever having been tainted. There is a suspicion that fresh sugar-beet may occasionally have been tainted, but even if this is so the taint certainly does not persist through the complicated refining processes into the final sugar.

Potatoes grown in land previously treated with BHC dusts on other crops, broadcast or by a combine drill, are very liable to be tainted for some years afterwards. A normal dressing for broadcast treatment is 6 lb. of crude BHC (13 per cent gamma-BHC) suitably diluted per acre and, under these conditions, we have said that potatoes must not be grown on the land in the two following years. We now know that under some conditions this period may not be sufficient - for reasons which follow. Combine seed drill treatment uses one-third to onehalf as much (2 to 3 lb. BHC) per acre and it is probable that the danger period is reduced somewhat. Jameson and Tanner 4 have recently provided a critical appraisal of this aspect of the problem.

As a matter of interest the taint susceptibilities of four typical potato varieties in England increase in the order: King Edward, Aaran Banner, Majestic and Eclipse.

There is a further complicating factor. A rate of application of BHC which, if applied evenly, is quite unlikely to cause taint in following crops, can readily cause patchy taint in those crops if the application is uneven. Surface treatment, e.g. for the control of flea beetle (Phyllotreta spp.) is not so dangerous as where the same amount of BHC is worked into the soil.

Treatments involving the use of crude BHC for the control of carrot fly (Psila rosa) have occasionally caused taint, but it seems likely that this will be overcome by the use of formulations based on pure gamma-BHC.

Crude BHC can be used quite successfully and without taint on top fruits, as will be shown in a more detailed statement later in this paper.

The story is quite different with black currants. These are particularly susceptible to taint from BHC and must not be sprayed or dusted with it under any circumstances. This also means that top fruits must not be sprayed with BHC if black currants are grown as an under crop.

The case of mushrooms is rather curious. One might have expected a crop with such a delicate flavor to be susceptible to taint, yet application of BHC dusts is widespread for the control of various insect pests and we have had no single report of taint. It is recommended, however, as a safeguard, that such applications should be made after a heavy picking. Similarly, BHC spray products have been used quite extensively on glasshouse tomatoes at all stages yet, again, there has been no report of trouble. On the contrary, onions, with a very strong natural flavor, can fairly easily have this flavor impaired by BHC applications.

Gamma-BHC Formulations

PRODUCTION of the substantially pure gamma-BHC at a reasonable cost proved difficult for some time, and even today it is necessarily an expensive chemical. So much so that it cannot be considered for such operations as control of locusts and malarial mosquitoes, where low cost is of first importance and taint problems negligible or nonexistent.

On the other hand gamma-BHC has proved technically satisfactory in experiments, and commercially acceptable to growers, either where the crop involved will stand the high costs of application per acre e.g. on flower bulbs, or where the discovery of new techniques has enabled very small and therefore inexpensive amounts of gamma-BHC to do a worthwhile biological job, e.g. on cereals.

One of our distinctive early contributions came in the field of the new techniques . the use of combined organo-mercury/gamma-B-HC seed dressings. However, in our field experience, even pure gamma-BHC has tainted such a root crop as potatoes and such fruit as black currants. It is true that it gives a different taint from that of crude BHC, but nevertheless it is a taint. Fortunately, this seldom appears at insecticidally satisfactory rates of application, but it does limit the amounts applied or the time of application in certain directions.

Specifically, we find that 0.5 lb. per acre of pure gamma-BHC is

the minimum for effective control of ordinary populations of wireworms in potato soils. But because such an application made just before planting may cause taint, we have found it necessary to use this amount either in the autumn previous to planting or in two halves spread over two seasons. It is true that this particular finding was based on work using a grade of BHC containing 90 per cent, gamma-BHC, but we find that the purest form of gamma-BHC, approaching 99.9 per cent. can also cause taint.

Seed Dressing Techniques

HE conventional organo-mercury cereal seed dressings used in Britain are almost exclusively about one fourth the strength of American dressings, but are used at four times the rate, i.e. at 2 oz. per bushel. Early in our work it occurred to one of the writer's colleagues that we should test seed dressings containing gamma-BHC. Even with the British rate of application of dressing and, further, our generally higher rate of seeding of some 21/2 to 3 bushels per acre, it seemed inconceivable that any worthwhile effect could be produced by the minute amounts of gamma-BHC that could be made to adhere to the seed. Nevertheless the experiments proceeded and it was discovered that as little as one twelfth to one fifth the previous minimum amount of gamma-BHC per acre could, by the new technique, give substantially complete protection of cereal crops against wireworm attack, in addition to the normal benefits of control of many seed-borne and some soil-borne fungi.

The earlier work in this direction has been reported by my colleagues, Jameson, Thomas and Woodward ² and Jameson, Thomas and Tanner ³, and such combined dressings have been used commercially in Britain for the three full seasons 1948/49 to 1950/51. Following is a summary of the later technical findings both from field experimentation at our Fernhurst Research Station and from our critical obser-

Program completely avoids danger from taint of apples and plums. No instance of taint noted on 4,000 treated acres of commercial top fruit during past three seasons up to 1950 in Britain

vations on many hundreds of farms throughout Britain.

So far as technical performance is concerned we estimate, in round figures, that broadcast treatments with BHC of the order of 6 lb. per acre give a 90 to 100 per cent protection of cereals from heavy wireworm attack, and extra tillering insures a full crop. With combine drill applications the protection may be 80 to 100 per cent, while the gamma-BHC seed dressing may not be quite so good, say 70 to 100 per cent. On the other hand the seed dressing application has cut costs in Britain to something of the order of one-sixth the cost of broadcast treatment, and made it worthwhile for farmers to use the seed dressing as a measure of insurance wherever wireworm attack is anticipated.

To summarize the relative amounts of gamma-BHC used in, and the farmer's costs of these various methods of treatment, the following table is presented:-

| | Oz. gamma- | Relative |
|------------------|------------|----------|
| Treatment | BHC/acre | costs |
| Broadcasting | 12 | 6 |
| Combine drilling | 4 - 6 | 2 - 3 |
| Seed dressing | 1 | 1 |

In addition to field experimentation my colleagues have visited a great many farms on which combined organo-mercury gamma-BHC seed dressings have been used, particularly with a view to investigating any suggestions of failure. It is of interest to learn that in the 1949/50 season only 0.05 per cent of the estimated acreage treated with these dressings showed complete failure; 0.15 per cent of the area showed some thinning of plants despite the applications; and the total number of complaints reported involved an area of 0.42 per cent of the total.

It was found that a few of the instances involved damage by leatherjackets (Tipula spp.) which are not controlled by such means. Of the remainder, a full analysis showed that the few failures were due to one of three causes, or a combination of them, as follows:

(1) where the farmer had failed to obtain a satisfactory seed bed. mainly due to excessive roughness and lack of consolidation, seed dressings were not able to exert their full effect, (2) where seeding rates had been reduced appreciably below the normal for the areas concerned, or the

then some trouble arose, and
(3) where the wireworms population was really excessive, for example, a million or more per acre, then
the new chemical tool was not adequate to give full protection.

seed had been inefficiently drilled.

It was also clear from the investigation that where differences occurred, spring sowings gave better results than autumn sowings; the product showed better effects on medium or light soils than on heavy soils; and that the poorer results were more evident on land after permanent grass than on any other class of land.

It may be added that, in our experience, emergency treatment of a crop already showing wireworm damage with a surface application of BHC does not give satisfactory economic results; such applications are worthwhile only if made before or at the time of seeding.

Top Fruit Sprays

In discussing top fruit sprays, it should be remembered that some of the English fruit pests are different from those in North America and, even among those common to both countries, the relative importance of some is quite different. Speaking of our British conditions, the insects concerned on, for example, apples are:

Apple blossom weevil - Anthonomous pomorum (Turn to page 113)

Agricultural Dust Hazards

ITH world agriculture becoming more and more mechanized, and with the evergrowing use of insecticides, fungicides, weed killers, and fertilizers, the phrase, "as clean as country air," has lost a great deal of its significance in recent years. As agriculture becomes more complicated, as more machines and chemicals are used to improve and increase production, respiratory problems due chiefly to dust hazards increase proportionately. The large intricate machines now used to prepare the soil, spread fertilizer, dust crops, and the like throw into the air large clouds of dust, some of them toxic. The necessity of ample protection against these newer hazards is quite obvious.

While it is true that most hazards are encountered in the "open air," where the contaminant has an opportunity to diffuse almost to an unlimited extent and thus reduce the relative risk, there are nevertheless many instances where a toxic dust may contaminate a confined space and maintain a higher concentration in the air. This is true in mixing and handling operations inside barns, in mixing and filling in factories, in application within greenhouses or other confined spaces.

In fact, in the case of chemicals, the dust hazard is not alone that of the farmer who uses the materials. It goes all the way back to the factory making the material and right down the line to the field or orchard where the product is used. Protection is necessary every step of the way. Not only has it become imperative in the light of new agricultural chemical developments that the manufacturer, the mixer, and the distributor supply necessary protection to their workers, but they car, impress upon the ultimate user, the farmer, at the time of purchase, that he too must avoid danger to himself and his workers during application by adequate protective equipment.

Twenty years ago, protection against agricultural dust hazards was not the problem it is at present. To-day, adequate protection for chemical handlers and farmers is vital, chiefly for two reasons: (1) new chemicals and new equipment, as noted, have introduced numerous new hazards, and (2) for its own interests, the agricultural chemical industry must meet criticism of new insecticide dangers by adequate protection of its own personnel and by more intensive education of farm workers in protective practices. The

by

R. B. Evans

Mine Safety Appliance Company

farm air contamination problem has become far more important with new equipment and methods, and can no longer be shrugged off as insignificant because it appears to be in the "open air."

Types of Dusts

A brief review from a physiological standpoint of the dusts which are now encountered in agriculture covers the following:

1. Nuisance dusts - dusts for which there is no known specific physiological response, but which contribute to the weakening of the respiratory system to permit susceptibility to lung diseases such as pneumonia and tuberculosis. An example of this is the dust thrown into the air while cultivating a dry field.

2. Irritating dusts - are those which cause an irritating sensation to some part of the body, but for which the physiological response does not go beyond the irritating factor. An example is lime dust, which causes a burning sensation in the nose and throat, and which irritates the eyes because of the formation of the hydroxide when lime comes in contact with water.

3. Fibrosis producing dusts - although these are not normally considered a hazard of the farm, it's well to mention that dusts of material such as quartz and asbestos produce a growth of scar tissue in







the lung, which after sufficient exposure, produces the treacherous lung diseases of "silicosis" or "asbestosis."

4. Protein fever producing dusts - these are the grain dusts, such as wheat, rye, and oats which produce serious asthmatic conditions in a significantly large number of those exposed.

 Allergy type dusts - are the pollens such as that of the ragweed, and animal hairs, which are harmful to those allergic to these types of materials.

6. Toxic dusts - many insecticides, fungicides and some fertilizers fall under this classification. Toxic dusts are poisonous materials which actually enter the blood stream, and cause damage there, or are transferred to some other functional part of the body, where the harm is accomplished. Lead and arsenic are two common examples.

Simple but effective dust respirators will protect against most of the air contaminants in the first five classifications. However, many compounds in the toxic dust classification are not stable; that is, they will not stay entirely in the solid or liquid form when thrown into the atmosphere. These particulates break down to form gaseous matter or vapors. The insecticides, parathion, TEPP, HETP (which are liquids absorbed in a clay particle) are good

examples of non-stable dusts. All of these compounds will evolve gaseous material when exposed to the atmosphere.

Protective Equipment

APPLICABLE respiratory protective equipment may be classified as follows: Mechanical filter respirators, chemical filter respirators, and gas masks.

1. Mechanical filter repirators are commonly called dust respirators and remove particulate matter from the inbreathed air by simple mechanical filteration. They remove the dust or mist particles from the air in the same manner as a screen separates pebbles from sand. An efficient mechanical filter respirator will afford good protection against harmful dusts and mists which will not vaporize or hydrolyze readily upon application. Mechanical filter respirators are available with a half-mask facepiece or a full facepiece. The latter is to be used when the dust or mist is harmful or irritating to the eyes as well as the respiratory tract.

 Chemical filter respirators are most often identified as chemical cartridge respirators and incorporate small cartridges filled with various chemicals which act as sorbents or reagents for certain gases and vapors. They are useful for protection against light concentration (not to exceed 0.1% by volume) of organic vapors only.

Spraying crews of most modern farms are now equipped with respirators having combination dust filters and chemical cartridges for respiratory protection during the outdoor application of the new organic insecticides. The mechanical filters screen out dust particles and the chemical cartridges remove organic vapors. During spraying operations, the filters are usually changed twice daily, once in the morning and once at noon. They can be changed quickly and independently of the chemical cartridges. The cartridges are changed once a day or whenever any odor penetrates the respirator.

3. Gas masks when organic insecticides, such as parathion are mixed sprayed or dusted in enclosed spaces such as greenhouses, the concentration is heavier and greater protection is required. This is also true of any material containing tetraethyl pyrophosphate or hexaethyl tetraphosphate. A heavy duty industrial gas mask with full facepiece and replaceable canister is recommended. This type of mask is

(Turn to page 111)

Photos above: (L to R) Mechanical filter dust respirator; combination dust filter and chemical cartridge respirator; and third, industrial gas mask. (Photos by Mine Salety Appliance Co., Pittsburgh, Pa.)

NFA

in 25th Annual Fall Southern Meeting; hears Government Officials discuss supply situation

HE next nine months or so may be the "most difficult for the fertilizer industry, some 500 representatives of the trade were told at the 25th annual Southern Convention of the National Fertilizer Association held in Atlanta, November 12-14. This assertion was made by Kenneth H. Klipstein, Assistant Administrator for Chemicals, Rubber and Forest Products Bureau, National Production Authority, Washington, D. C., one of four speakers taking part in a discussion of "The Government and the Fertilizer Industry" on Nov. 14.

Following a meeting of the NPA's executive committee and board of directors on Monday, the meeting proper began on Tuesday morning. Board chairman, James E. Totman, Summers Fertilizer Co., Baltimore, Md., presided at the opening session, presenting his annual address before the group. Pointing out the difficulties being faced by the fertilizer industry at the present and the prospect of further troubles in securing the needed materials for full production, Mr. Totman presental production, Mr. Totman presental control of the production of th

ented a picture of the status of nitrogen, potash and available phosphoric acid.

Nitrogen, he reminded, is an important element not only to the fertilizer industry, but is basic in nearly all modern explosives. Although the supply of the element is inexhaustible, comprising some

BOARD OF DIRECTORS MEETS

The board of directors and officers of the NFA at the 1951 fall meeting. Atlanta. Ga.: left to right. seated: James W. Dean. Knoxville, Tenn.: Fred S. Lodge, secretary and treasurer: Mary Wallace Nelson, secretary to the president: Russell Coleman, president; J. E. Totman, Baltimore, Md., Chairman of the Board: Louis Ware, Chiczge, Ill., vice-chairman of the Board: Weller Noble. Berkeley, Calif.: F. N. Bridgers, Wilson, N. C.: standing: E. S. Russell. South Deerfield, Mass.: H. B. Fullt. Miami. Flaz. T. W. Allen, Attalla, Ala.; John E. Powell. Columbus, Ohio: Walter E. Meeken, Boston, Mass.: Moultrie J. Clement, Pensacola, Flaz.: R. L. King, Valdoats, Gaz. C. R. Martin, Dayton, Ohio: L. G. Black, Corning, Ark.: C. T. Prindeville, Chicago, Ill.: L. Graham Campbell, Cranbury, N. J.: J. L. Nichols, Sumter, S. C.: R. D. Martenet, Indianapolis, Ind.: A. A. Schultz, Reading, Pa.: E. A. Geogheghan, New Orleans, La.: J. E. Nunally, Atlanta, Ga.: A. B. Kincaid, Columbia, S. C.: Ralph E. Fraser, Baltimore, Md.: Morten S. Hodgson, Athens, Ga.: John Miller, Louisville, Ky.: J. E. Epting, Leesville, S. C., L. D. Hand, Pelham, Ga.

four-fifths of the atmosphere, the capacity to fix this inactive nitrogen into forms usable as plant food is somewhat taxed to meet the current demand.

He declared that fertilizer manufacturers should use every pound of nitrogen in liquid forms that their output and equipment will permit. "Our only hope to meet the demand for agricultural nitrogen this season is to make the most of the liquid forms," he concluded.

So far as potash is concerned, the industry's position is also reasonably satisfactory. "Present estimates of production indicate that we will have some 5% more potash than last year," the board chairman declared.

The situation on available phosphoric acid is not so optimistic, Mr. Totman told the group. With the fertilizer industry ranking as the largest user of both sulfur and sulfuric acid, it has received a great deal of attention in Washington. Limitation orders have given the industry about 90 percent of the sulfuric acid it used last year; but for-



tunately, said Mr. Totman, the trade is not entirely dependent on virgin sulfuric acid made from brimstone, but utilizes large tonnages of acid produced as a byproduct from various smelting processes.

Efforts to produce available phosphoric acid by means other than using sulfuric acid were declared to be unfeasible now, with shortage of construction materials, the time element and economics. Mr. Totman pointed out that sulfuric acid can be made from gypsum...at a price. Pyrites could be burned as a substitute for sulfur in making acid... provided we could obtain the pyrites and the furnaces in which to burn them.

As to proposals to acidulate by nitric acid or by mixtures of nitric acid sulfuric acid, with subsequent ammoniation with anhydrous ammonia, he said that these processes, although technically sound, have not been proven from the standpoint of economics. Great quantities of stainless steel and heavy construction with scarce steel would be necessary. (Mr. Totman's full text appears on page 35, this issue.)

Photos this page: Top row. (L to B): J. K. Sparkman, Mrs. J. K. Plummer. Dr. Plummer and E. S. Strong, all of Tonnessee Corp. Atlants: J. Frank Greeley, Fulton Bag Co.: W. Gedge Gayle. Kelly. Weber & Co.. Lake Charles. La.: Louis J. Even. Fulton Bag Co. and G. A. Foss. Kelly. Weber & Co.

Second row: Dr. Edwin C. Kapusta and Mary Wallace Nelson, NFA, Washington. Wm. E. Merritt. Ashcraft-Wilkinson Co., Atlanta: and A. B. Everett. Swift & Co., Columbia, S. C.; and A. L. Wiley, Swift & Co., Atlanta.

Third row: Unidentified conventioneer chats with Asron Baxter. Coke Oven Ammonia Research Bureau, and Dr. Kapusta. F. S. Lodge. NFA and Dr. Bruce Cloaninger. Clemson, S. C.

Fourth row: Mr. Huschke: Mr. Gran. and Harold C. Haase, Gonaler International Corp. Puerto Rico. Kenneth Keith. Spencer Chemical Co., Kansas City. Mo.: Dallas Cantwell. Spencer Chemical Co., Atlanta: and J. E. Reynolds, Ir.. Thurston Chemical Co., Joplin, Mo.

Bottom row: Dr. C. C. Compton. Julius Hyman & Co., Champaign. Ill.: J. F. White. Julius Hyman & Co., Jackson. Miss.: Gus Ashcraft. Ashcraft-Wilkinson Co., Atlanta: and F. J. Purcell. Combustion Engineering-Superheater. Inc., Atlanta: Robert H. Walton, U. S. Potash Co., Atlanta and Dean Gidney, U. S. Potash Co., New York.

The grasslands of the United States are the greatest potential resource we have for increased production of livestock feed, and hence of meat and dairy products," the group was told by Dr. W. M. Myers. director of field crops research, U. S. D. A., Beltsville, Md. He termed grassland improvement as an opportunity, but also a necessity, "if we are to provide the feed for the increasing livestock numbers necessary





I. E. TOTMAN

H. A. MYERS

K. H. KLIPSTEIN

H. A. KRUEGER

L. G. PORTER S. P. WIMPFEN

to meet our demands for meat and dairy products in the years ahead." He termed a "false concept" the idea that only by the production of cash row crops can agriculture prosper. "I am convinced that the grasslands are productive and that grassland improvement has an essential role to play in increased agricultural abundance," he declared.

In the first place, we need more livestock products in the U.S. "We are a meat-eating and milkdrinking nation," he pointed out. Short supplies, increased demands, high prices and prospective deficiencies in feed production are sources of concern to producer and consumer of meat alike. In 1950, Americans ate 30 pounds more meat per person than in the period of 1935 to 1939. This amounts to an increase of about 20 percent. With better incomes, meat will be even more in demand, he said, and this factor, added to the increasing population, provides good basis for a "serious meat problem."

Developing a broader grassland program will not only help out in the meat situation, but will also reduce erosion hazards, and will fit in well with rotation plans.

Dr. Myers emphasized that he does not favor the abandonment of all cultivated crops, nor the seeding down to grasses and legumes of all the agricultural land of the nation. Rather, "Grassland farming is a system based on adequate and intelligent usage of grasses and legumes in rotation - in which the grasslands are an integral part of the cropping system in which some areas, unsuited for cultivation, are converted to permanent grasslands and other areas are placed in crop rotation with sufficient proportions of grasslands to protect the soil and to provide profitable and sustained production of the cultivated crops. In fact, in grassland farming, pasture, hay and grass silage are cultivated crops, receiving and warranting as much care as is lavished on what are now commonly-called 'cultivated crops'," he explained.

That safety is good business, was emphasized by H. R. Krueger, Phillips Chemical Co., Bartlesville, Okla., and a member of the advisory committee of the Fertilizer Section, National Safety Congress. In a talk on November 13, he pointed out the financial gains to be derived from a better safety record in the industry. Not only from reduced insurance premiums will the industry gain, he said, but also from the increased efficiency which comes as a byproduct of more attention to safety. "Accidents and injuries are the most costly items in our economy, since they require triple payment: first, by the injured in pain, suffering, and often incapacitation or death; second, by the injured's family in worry, sorrow and loss of income; and third, by the employer in loss of productivity, damaged equipment and higher costs of insurance premiums," Mr. Kreuger declared. Beyond this, he said, are the more subtle depredations into the morale and efficiency of the remaining workers and into the reputation of the plant as a prospective place of employment to attract the

better workers of the community.

He reported to the group that a Fertilizer Sub-Section of the National Safety Congress has been formed in an effort to better the record of the industry as a whole. Safety must be a very personal thing, he declared. Plant owners must be willing to spend the money for plant improvement, supervisors must provide the rules and employees must abide by them. By this means, benefits accrue to all, he said.

Government and Industry

OVERNMENT and the Fertilizer Industry was the subject for discussion on Wednesday, November 14. J. E. Totman acted as chairman of the session as speakers representing various departments of government appeared on the program.

Kenneth H. Klipstein presented to the group some background information on allocations and government orders covering materials such as nitrogen, sulfur and steel for the construction of new manufacturing facilities. He pointed out the many uses for sulfur aside from the fertilizer industry, emphasizing its importance in metallurgy and the manufacture of plastics, rayon, paper, and the processing of rubber, synthetic detergents and other wartime necessities.

He told how statistics have been gathered through questionnaires and other means, and of the importance of this type of information in deciding about the essentiality of different commodities. Although there are 150 supply & demand studies under way at present, only nine schedules for allocation have been issued. There are several reasons for this, he said. Industry has expanded, and has provided for military needs indirectly through greater production. The industry has been "most cooperative," he reported.

So far as sulfur is concerned, Mr. Klipstein quoted Bureau of Mines figures to show how supplies of the element have steadily decreased since 1942.

William R. Allstetter, scheduled to appear on the program was unable to be present due to illness. However, in his place, chairman Totman called on Louis G. Porter, U. S.D.A., Washington, to discuss the nitrogen situation. This element is some 500,000 tons short, he reported. A hundred thousand tons a year are needed to keep pace with increasing population in the U. S. It is calculated that a pound of nitrogen per acre will equal approximately 1% increase in crop yields, and from that

(Turn to page 105)

Photos. this page. Top row, (L to B): Speakers of final morning's program: Kenneth H. Klipstein. Sheldon P. Wimpfen. J. E. Totman. Cedric Gran. L. G. Porter and H. A. Huschke. (2nd photo): Mr. Porter again. James Natiel, Pacific Coast Borax Co.: and H. H. Tucker. Coke Oven Ammonia Research Bureau. Columbus. Ohio.

Second row: Charles Mittleman. Kraft Bag Co., New York: Thomas B. Athey. Albermarle Paper Mig. Co., Richmond. Va.: H. H. Miller. Bemis Bro. Bag Co., Norfolk. Va.: J. L. Nichols. Sumpter Fertilizer Mig. Co., Inc., Sumpter. S. C.: and A. A. Schultz. Reading Bone Fertilizer Co., Reading. Pa.

Third row: Walter S. Dennis, International Minerals & Chemical Corp.. Raleigh, N. C.; Dr. H. B. Mann, president. Potash Institute of America. Washington. D. C.; Dr. W. L. Nelson. North Carolina State College. H. A. Krueger, Phillips Chemical Co.. Bartlesville, Okla.; Dr. Russell Coleman. NFA president: and Dr. H. M. Myers, U.S.D.A.. Washington. D. C.

Fourth row: George V. Taylor, Spencer Chemical Co., Kansas City, Mo.; Dr. Coleman: and J. K. Sparkman, F. W. Darner and A. A. Nikitin, all of Tennessee Corp., Atlanta.

Bottom row: J. Rucker McCarty, International Minerals & Chemical Corp., East Point, Ga.: Fred S. Lodge, NFA, Washington: L. Graham Campbell, Chamberlin & Barclay, Cranbury, N. J.: and Robert H. Engle, NFA, Washington, Dr. M. H. McVickar, NFA, Washington, and H. H. Tucker.









Photos above: (L to R) Gordon H. Nehls and James H. Hemmuck at work in V-C laboratory at Cincinnati plant. Third chemist, Jesse Haubner, was absent when picture was taken. (Center) (A. J. Darlus, sales manager; T. D. Bass.

V-C assistant sales manager. Richmond: C. C. Arledge. V-C vice-president in charge of sales. Richmond: J. C. Edge. Superintendent of Cincinnati plant: and C. T. Harding. Richmond. general man-

ager of mfg. department. (Last photo) C. J. Peitz. V-C salesman. Clifton Long. V-C advertising manager. Richmond: and Clarence Short. Tobacce By-Products & Chemical Corp., Cincinnati.

V-C Opens its New Cincinnati Fertilizer Plant

ORE than 200 persons attended an "open house" in connection with the opening of Virginia-Carolina Chemical Corporation's new 100,000 ton fertilizer plant at Cincinnati, November 8 and 9. The new installation replaces the old one which was destroyed by fire in May, 1950.

In observance of the opening, V-C invited its farmer customers, the press and other interested persons to inspect the entire plant and to have each operation explained by staff members. A number of representatives of the company's home office in Richmond, Va., were on hand to greet the guests. Refreshments were served at the end of the trip.

Among the busiest—and proudest—of the guides showing off the new plant, were J. C. Edge, superintendent; his assistant, Tom Rutledge; Frank Adamson, plant engineer and the two foremen, Robert Fangmann and Howard Dunn. This, of course, is not to overlook the escorting done by others, as well. These included A. J. Darfus, sales mana-

ger of a territory comprising not only the area around Cincinnati, but all V-C fertilizer sales in Ohio, Kentucky, Indiana and Michigan. (Deliveries in the more distant areas are made from V-C plants at Ft. Wayne, Ind.; Mt. Pleasant, Tenn., and Baltimore)

On hand from Richmond, were C. C. Arledge, vice-president in charge of sales; T. D. Bass, ase't. sales mgr. Clifton Long, advertising manager, and C. T. Harding, general manager of the company's manufacturing department. Salesmen

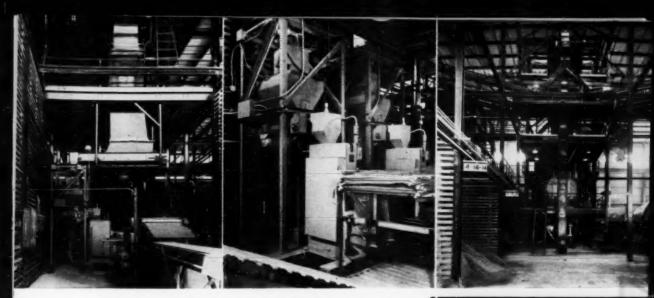
Photos below (L to R) C, S. Griffith. V.C. Cincinnati "Traveling Superintendent"; J. E. Van Kirk. salesman, Jackson. Mich.: and Edward Ryland. retired vice-president in charge of manufacturing. Center picture: group of V-C

salesmen at the open house, left to right: R. L. Blakey, Robert L. High, C. H. Godfrey, B. H. Brinkman, Tom Rutledge, A. J. Darfus, manager: C. J. Peitz, Geo. L. Balfe, J. C. Edge, superintendent: J. E. VanKirk: and D. J. Williams. Last photo: studying blueprint of new plant. are T. P. Rutledge, assistant superintendent: J. H. Hammack. and J. C. Edge, superintendent.









from many sections were also on hand for the festivities.

A typical trip through the 200 x 500-ft. building begins at the 3-track siding where raw materials arrive. A crew of Hough "Payloaders" make quick work of unloading box cars, while hopper-bottom gondolas dump their burden in pockets below the tracks. The material is then conveyed on belts to various storage points.

Heart of the plant is the 80-ft. span six-ton Shepherd-Nile overhead crane. It is operated by one man and its clamshell picks up 3 tons of material with each "bite." The crane ranges the entire 300-ft. length of the crane building.

So basic is the crane to the plant's operation, that the company keeps on hand spare motors and other key parts which may be in-

INSIDE NEW V-C PLANT

Three photos above give general view of plant's interior. Overhead conveyor belts transport material to or from storage as well as to formulation hoppers. Wet mixing equipment furnished by Sturtevant Mill Co.. Boston: conveyors built by Rock Island Steel Co. and Richmond Steel Co.. but designed by V-C. Plant has storage facilities for many thousands of tons of mixed fertilizers.

stalled quickly in case of breakdown. A rotary converter changes the AC current to DC for the crane's use and since this generator is so necessary, at least two spare armatures are to be seen waiting for the present one to wear out. As Mr. Harding explained to visitors, "When the crane quites working, the plant shuts down." He reports, too, that the big crane, fortunately, was "parked" in an extreme end of the building at the time of the fire and was thus relatively unharmed in the blaze.

All the materials used in manufacturing are handled by the crane. Although its immediate scope is limited, it can feed a system of overhead conveyor belts which transport the material to or from storage, as well as to the formulation hoppers. All of the overhead conveyors were engineered by V-C and built by Rock Island Steel Co., Rock Island, Ill., and by the Richmond Steel Co., Richmond, Va.

The wet mixing process equipment itself is of modern design, furnished by Sturtevant Mill Co., Boston, Mass.

Constant check is kept on all mixed fertilizers before they are bagged. A complete analytical laboratory with three full time chemists is maintained by the company as a final guard against error. The chemists, with James H. Hammack, Jr. in charge, are Gordon H. Nehls and Jesse Haubner, who use regular A. O.

(Turn to page 91)



Hough Payloader digs into pile of material.



Conveyor belts reduce labor to minimum.

Below: Loading bagged fertilizer on R.R. car.



Cincinnati Scene of Joint meeting between

Phytopaths and Entomologists

as well as complete individual programs were planned for the joint meeting of the American Association of Economic Entomologists and the American Phytopathological Society at the Netherland Plaza Hotel, Cincinnati, Ohio, December 10-13. The complete program was published in the November issue of Agricultural Chemicals, but high spots of the four-day meeting will bear emphasizing once more.

These include a joint symposium on insect-transmitted plant diseases, a joint extension symposium, and joint symposia on teaching and pesticides. First of these symposia was to be held Monday evening, December 10, under the co-chairmanship of H. E. Petty, University of Illinois, entomologist, and L. O. Weaver, plant pathologist. "Existing and Proposed Legislation on Application of Agricultural Chemicals" was to be discussed by W. W. Sunderland, Dow Chemical Co., Midland, Mich.; and "Recent Legislation Dealing with Pesticides" was the announced subject of a talk by E. L. LeClerg, U. S. Department of Agriculture.

A second symposium was scheduled for Tuesday afternoon under the chairmanship of Dr. W. L. Popham, assistant chief, Bureau of Entomology and Plant Quarantine, U.S.D.A. Participating in this part of the program were to be C. W. Bennett, Riverside, Calif.; F. O. Holmes, Rockefeller Institute for Medical Research; J. H. Freitag, Univ. of Calif.; and W. F. Turner, U.S.D.A., Ft. Valley, Ga.

Another joint session is slated for Wednesday afternoon, Dec. 12, with co-chairmen L. H. Townsend, entomologist, and G. C. Kent, plant pathologist. This joint session was to discuss teaching of entomology and plant pathology.

Concurrently, another sym-

Avery S. Hoyt BEPQ Chief on Program



Dr. Roy E. Campbell



Dr. Charles E. Palm
A.A.E.E. Vic.-President



AGRICULTURAL CHEMICALS



Dr. George L. McNew Co-chairman of Symposium



Dr. L. Gordon Utter Heads Fungicide Col'oquium



Dr. James G. Horsfall
APS President on Program

posium was scheduled to be held on pesticides. Co-chairmen were to be Carl J. Weiman, entomology, and George L. McNew, plant pathology. The program, as announced in advance of the meeting, was to be as follows:

The Principles and Progress in Systemic Protection of Plants. (a) "Insecticides," A. Bruce Gleissner, American Cyanamid Co. and (b) "British Research on Systemic Fungicides," Eric Sharvelle, Purdue Univ. "The Interaction (Compatibility, Phytoxicity and Pesticidal Potency) of Insecticides and Fungicides in Simultaneous Application," A. B. Groves, Virginia Agric. Exp. Sta., Winchester. "Legislative Control of Pesticide Usage," George C. Decker, Illinois Natural History Survey. "The Cost of Research in Agricultural Chemicals," R. H. Wellman, Carbide and Carbon Chemicals Co. and "The Toxicology and Hazards Record of New Pesticides," Frank Princi, Univ. of Cincinnati.

One of the high points of the APS meeting was to be the Fungicide Colloquium, scheduled for Tuesday evening, December 11th. Chairman of this session is Dr. L. Gordon Utter, Phelps-Dodge Refining Corp., New York. The program was to include presentations by industry representatives, of new fungicide products which have been tested during the past season, or which are just

being introduced. Speakers were invited to distribute mimeographed or printed literature describing the products.

The colloquium was to include the following talks in addition to the industry presentation:

"Federal Legislation." L. S. Hitchner, executive secretary, National Agricultural Chemicals Association, Washington, D. C.; "Toxicology of Fungicides," Henry H. F. Smyth, Jr., Mellon Institute: "Program of Science Service Laboratory, London, Ontario," Herbert Martin, director; "Concentrate Sprays-Fruits," Dean Asquith, Pennsylvania State Coll.; "Concentrate Sprays-Vegetables," J. D. Wilson, Ohio Agric. Exp. Sta.; "Antifungal Antibiotics," W. Keith Smith, Univ. Rhode Island and Imperial Chemical Industries, Butterwick Lab., England.

AAEE Sessions

R EPORTS on the Ninth International Congress of Entomology held during the past summer; papers on insects affecting fruits; a section on apiculture; another on insecticides and information on biological control of insects are on the agenda for the American Association of Economic Entomologists' portion of the program.

In addition to the joint symposia already mentioned, the A.A.-E.E. was to have a special session on insect pest surveys, with Avery S. Hoyt, chief of the Bureau of Entomology and Plant Quarantine, U.-S.D.A., Washington, D. C., as chairman.

The advance program called for the following speakers and their subjects: "History of State-Federal Insect Pest Surveys," J. J. Davis, Purdue University; "Importance and Value of Economic Insect Surveys to our National Agriculture," George C. Decker, entomologist, Illinois State Natural History Surveys, Urbana, Ill.; "Importance to Industry of Economic Insect Surveys," Lea S. Hitchner, National Agricultural Chemicals Association, Washington, D. C .: "Economic Insect Surveys in Relation to Biological Warfare Defense," M. R. Clarkson, special assistant to the administrator of the Agricultural Research Administration in Charge of Defense Efforts; "State Surveys in Relation to National Insect Problems," H. M. Armitage, California State Department of Agriculture: "The Use of Survey Information in Effectuating Insect Control," W. C. Nettles, Clemson Agricultural College, Clemson, South Carolina; and "A Program for Federal-State Cooperative Economic Insect Surveys, Kelvin Dorward, Bureau of Entomology and Plant Quarantine, U. S. D. A., Washington, D. C.

A section of medical entomology was scheduled for both Tues-(Turn to Page 93)

F. F. Smith named chairman, Chapman vice-chairman at New York meeting of

Eastern Branch, A. A. E. E.

TN its 23rd annual meeting in New York, November 15 and 16, the Eastern Branch of the American Association of Economic Entomologists elected as chairman for 1952, Dr. Floyd F. Smith, U.S.D.A., Beltsville, Md.; presented some 35 technical reports; and went on record as opposing government moves toward reducing the efficacy of the Department of Agriculture's Bureau of Entomology and Plant Quarantine. Other officers named at the meeting in addition to Dr. Smith, who succeeds Dr. F. H. Lathrop, Orono, Maine, were: Dr. P. J. Chapman, New York State Agricultural Experiment Station, Geneva, vice-chairman, succeeding Dr. Smith: and Dr. B. F. Driggers, Rutgers University, New Brunswick, N.J., was re-elected secretary-

Present at the New York meeting was Dr. Roy E. Campbell, Alhambra, California, president of the parent group, the American Association of Economic Entomologists. Called upon for a few impromptu remarks during Friday's session, Dr. Campbell expressed his appreciation for the cooperation of the various branches in furthering the cause of entomology, and made a plea for non-members to join the group to give the Association more strength both numerically and from the standpoint of adding to its total wealth of knowledge. He brought the Eastern Branch greetings from both the parent Association and the other regional

Opening paper on the first session of the program, November 15, was "The Control of Peach Insects with Dilute and Concentrated Spray Applications," by Castillo Graham of Hañcock, Md. Of the materials tested, dieldrin, parathion, "EPN 300" and "Metacide" gave good control. "Systox" proved ineffective under the conditions of these particular tests. Control with "3X concentrate," using 1.2 gals. per tree was equal to results with dilute applications of 4 gals. per tree.

Reporting on "Control of the Pear Borer on Apple." A. M. Woodside of Staunton, Va., indicated that good results were obtained using three sprays containing parathion at the rate of 2 lbs. 15% wettable powder per 100 gals., applied during the flight period of the moth. One spray containing 3 lbs. parathion or 2 lbs. "EPN 300" and two sprays containing 5 lbs. of 50% DDT also gave good results. It was noted that effective control cannot be obtained under conditions of heavy infestitation by spraying one year only, because of the two-year life cycle of part of the borers. Under such conditions a spray containing 5 lbs. of 15% parathion or 3 lbs, of "EPN 300" should be applied late in May or early in June, two years in succession, or two sprays containing 3 lbs. of parathion or 2 lbs. of "EPN 300" should be applied late in May or in mid-June two years in succession.

From experiments conducted by John G. Matthysse and John A. Naegele, Cornell University, Ithaca, N.Y., on the control of spruce mite and southern red mite, it was reported that "Ovtran" gave outstandingly good residual action with a single application. Reporting on "Response of the Large Milkweed Bug to Sublethal Concentrations of DDT and Toxaphene," James McD. Grayson, Agr. Experiment Station, Blacksburg, Va., indicated that their experimental work to date has shown that a slight resistance has developed after twelve generations.

In the paper "Relation of the Sex Chromosome to DDT Resistance in the German Cockroach," by D. G. Cochran, J. M. Grayson and Max Levitan, also of the Blacksburg station, it was concluded on the basis of their work to date, that DDT resistance is not a simple sex-link factor.

William J. Goodwin, Cornell University, reporting on "Control of the Cattle Mange Mite, Chorioptes bous" indicated that a wettable sulfur-lindane combination was the most effective treatment of those tested. Lindane emulsion was the next best The lindane-sulfur combination is being recommended for large scale operations in New York State this winter.

Reporting on "Further Experiments on Pea Aphid Control," L. P. Ditman of College Park, Md., reviewed recent experiments with the use of parathion, octamethyl pyrophos, "4049" and DDT, all four of which he reported gave good control. In work with low gallonage sprays (30 gals. per acre) DDT emulsion and "4049" proved superior to 1% parathion dust and to 1% DDT dust at 40 lbs. per acre. Results with "4049" were particularly encouraging, and no residues were present on peas or vines at harvest. Attempts to control pea mosaic, with octamethy!

NEW OFFICERS

(Left to Right): Dr. Floyd F. Smith. newly-elected chairman of the Eastern Branch A.A.E.E.; and Dr. P. J. Chapman. New York State Agricultural Experiment Station. named vice-chairman at the meeting. Dr. B. F. Driggers. Butgers University, New Brunswick, N. J., was re-elected secretary-treasurer.

seed treatment, however, were not as successful. It was found impossible to eliminate mosaic with one-half pound of this treatment to the bushel, or with octamethyl seed treatment plus two DDT emulsion sprays. And as a final limitation on use of this material for control of mosaic, o.1 ppm of the octamethyl were found in shell peas which had been treated.

H. L. House, Dominion Parasite Laboratory, Velleville, Ont., Canada, presented a paper describing a chemically defined diet and aseptic technique for rearing house-flies. He reported that such studie, had proved successful, using a nutritive formula including nineteen amino acids, cholesterol, dextrose, ten "B" complex vitamins, a salt mixture and cystine. Sodium hydroxide is used in the preparation of the formula to adjust the pH to 5.8 and preserve jelling properties in air.

Bacteriologically sterile larva are obtained by treating the eggs with disinfectant. The eggs are then placed in a tube containing some of the chemical diet, stoppered and maintained at 22° C. until hatched. The larva are allowed to develop under

controlled conditions.

"The Effect of Sub-lethal Doses of Toxicants on the Susceptibility of Insects to Insecticides" was described by Raimon L. Beard, Agricultural Experiment Station, New Haven, Conn. He reported that studies of the effect of sub-lethal doses were made using nicotine, DDT, pyrethrum and arsenic. Results did not indicate conclusively, that pests acquired sensitivity as a result of a primary treatment of the insecticides,



as compared with the control, he

A paper by H. H. Incho and H. Greenburg, U.S. Industrial Chemicals Co., Baltimore, reported on "The Synergistic Effect of Piperonyl Butoxide with the Active Principles and with Allethrolene Esters of Chrysanthemum Acids." They reported a study in which the relative degree of synergism exhibited by the separated active principles of pyrethrum in combination with piperonyl butoxide indicated that none of the components had greater synergism than the pyrethrum from extracts.

Kelvin Dorward, U.S.D.A. entomologist, brought the group up to date on the "Present Status of the State-Federal Cooperative Insect Survey and Detection Program." Reasons for the increase in cooperative insect survey, or detection, activities include the Federal Civil Defense Administration's request for more protection against international introduction and spread of diseases and pests of livestock, crops and forests. It was also reasoned that the more current and complete information there is available on insect conditions throughout the country in normal times, the easier it is to make plans for protecting crops and animals against insect and other pest

Mr. Dorward reported that the Division of Insect Survey and Information has notes on more than 10,000 domestic genera and 24,000 domestic species; on more than 8,000



foreign genera and 30,000 foreign species. Notes pertaining to domestic insects total more than 400,000 and to foreign insects more than 125,000. The files also contain notes on 2,000 species, he said.

He reported also that the program has considerable flexibility, and that it could be of potential value in time of emergency as well as in times of peace.

"Synergist Action of Piperonyl Butoxide Fractions and Observations refuting a Pyrethrum-Butoxide Complex" was the title of a paper presented by A. C. Miller, Gulf Research & Development Co., Pittsburgh, Pa. (Co-authors with Mr. Miller, were J. P. Pellegrini, Jr.; A. Pozefsky and J. R. Tomlinson, also of Gulf)

The authors presented data on the physical and biological properties of piperonyl butoxide fractions, and told of tests made by the Largegroup Peet-Grady method using about 500 flies per test unit. Pyrethrins alone gave a 24-hour kill of 23% as compared to kills of 81 and 80% for sprays of pyrethrins and 0.045% butoxide fractions.

A second test, a fraction containing 14% butoxide showed no activity as a pyrethrins synergist. Another series showed a mortality for pyrethrins alone, of 20.3% for a 24-hour period, as compared to effectiveness as high as 83.1% for one of several other fractions involved in the tests.

State

Fertilizer Controls

Part II -

Part I, appearing in the November issue carried summaries of fertilizer laws of 24 states. Part II, herewith continues the series by Mr. Couner.—Ed.

Virgima²⁵

Scope The law applies to commercial fertilizers, but does not define the term. Excluded from the scope of the law are lime, land plasters, ashes, common salt or unground tobacco stems, when sold as such, and unmixed with other fertilizer materials.

Registration Fees The annual registration fee is \$2.00 per brand. The fee is payable on or before January 1.

Tonnage Reports and Fees: In addition, an inspection fee is imposed at the rate of 20¢ per ton. This fee is based on quarterly tonnage reports required to be submitted in April, July, October, and Lanuary.

Labeling Recourements: In addition to a statement as to weight, brand and maker, labels must show the guaranteed analysis. The analysis must state the minimum percentages of total nitrogen, nitrogen in the form of nitrate, if claimed, water insoluble nitrogen, available phosphoric acid, available potash, and the total magnesium oxide, if claimed. In addition, the number of pounds of borax must be shown and whether the fertilizer is acid-forming or non-acid-forming.

In the case of mixed fertilizer branded for tobacco, the guaranteed analysis shown on the package or on the tag must also include the maximum chlorine percentage.

In the case of brands registered as "open formula," it is required, in addition to the above, that a tag be attached to each package stating the brand name, the guaranteed analysis, the name of the materials and the quantity of each used per ton in compounding the same, and the name and address of the manufacturer.

Midwestern States

Illinois 26

Scope: The law defines fertilizers to include any substance designed and offered for sale for use in inducing increased crop yield when applied to the soil. Exempt are agricultural limestone, marl and unprocessed animal manure, which have not been manipulated so as to alter or change them chemically, and burnt or hydrated lime.

Registration Fees: An annual registration fee of \$25.00 is required for each brand. The fee is payable in December.

Tonnage Reports and Fees: In addition, an inspection fee is imposed at the rate of 10e per ton. The fee is based on semi-annual tonnage reports submitted in July and January. The registration fee is used as a credit on this fee.

Labelong Requirements: In addition to the statement as to weight, brand, and maker, fabels must state the guaranteed analysis. The analysis must show the minimum percentages of nitrogen, available phosphoric acid, and potash soluble in water. When potash is derived from sulphate or carbonate of potash, it may be so claimed.

In the case of bone meal, tankage or other organic products and in basic slag and mineral phosphates, the phosphoric acid must be claimed as total phosphoric acid, unless it is desired to claim available phosphoric acid instead, in which latter case the guaranty must take the form set forth above.

Indiana 27

Scope: Commercial fertilizers are defined to include every substance imported, manufactured, prepared or sold for fertilizing or manurial purposes, except barnyard manure, marl, lime, wood ashes and plaster.

Registration Fees: The inspection and analysis fee is \$2.00 per brand. In addition, labels must be purchased from the State Chemist at the rate of \$1.00 per 100.

Tonnage Reports and Fees (See label fees above)

Labeling Requirements: In addition to a statement as to weight, brand, and maker, 'abels must state the guaranteed analysis. The analysis must show the minimum percentages of nitrogen, potassium oxide soluble in water, and phosphoric acid, or in the case of acidulated goods, of soluble and reverted phosphoric acid and of insoluble phosphoric acid.

Labels are furnished by the State Chem-

Iowa 28

Scope: Commercial fertilizers are defined to include any substance, including any combination or mixture of substances, designed and fit for use in inducing increased crop yields or plant growth when applied to the soil. Unmanipulated animal and vegetable manures, burning materials, and gypsum, are excluded.

Registration Fees: The registration fee is \$25.00 for each brand, expiring annually on July 1. Registration may be renewed for the period of one year with the payment of a renewal fee of \$1.00.

Tonnage Reports and Fees: In addition, an inspection fee is imposed at the rate of 10¢ per ton. The fee is based on semiannual ronnage reports due on or before July 1 and January 1.

Labeling Requirements: In addition to a statement as to weight, brand, and maker, labels must state the chemical analysis. The analysis must show the percentages of nitrogen, available phosphoric acid, and available potash.

In the case of bone, tankage, natural mineral phosphates, or other unacidulated phosphoric fertilizer materials in which the phosphoric acid is not shown by laboratory methods to be available but may eventually become available in the soil, the phosphoric acid may be guaranteed as total phosphoric acid.

Kansas 29

Scope: Commercial fertilizers are defined to include any substance designed, intended, used or susceptible for use to supply food for plants or to increase crops produced by land. Specifically excluded are limestone, dolomite, lime, slaked lime, gypsum, the dung of domestic animals, and fertilizer materials. Fertilizer materials are defined to include any substance con-

by John D. Conner Washington, D. C.

taining plant food elements or compounds in possession of manufacturers for use in compounding mixed commercial fertilizers.

Registration Fees: The registration fee is \$5,00 for each brand. The fee must be renewed annually on June 30,

Tonnage Reports and Fees: In addition, an inspection fee is imposed at the rate of 20¢ per ton. The fee is based on semi-annual tonnage reports submitted in January and July.

Labeling Requirements: In addition to the statement as to weight, brand, and maker, labels aust state the guaranteed analysis. The analysis must show the minimum percentages of nitrogen, available phosphoric acid, and soluble potash.

In the case of unacidulated mineral phosphatic materials and basic slag and in the case of bone, tankage, and other natural organic phosphate materials, total phosphoric acid may be shown.

Commercial fertilizers, containing any ingredient which is injurious to plants, must also be labeled to show the name and percentage of each such active ingredient, adequate directions for use, and adequate warnings against misuse.

In addition to the above, labels must show the minimum percentage of all secondary and minor plant food elements or compounds contributing to the value of the fertilizer.

Kentucky 30

Scope: The law applies to commercial fertilizer, but does not define the term.

Registration Fees: Although registration is required, there are no registration fees. Tonnage Reports and Fees: Labels must be purchased from the Director of the Agricultural Experiment Station. The price of labels is 50¢ for such number as may be required for one ton of fertilizer.

This is the only fee required. The Director may require manufac-turers to notify him of the kinds, amounts, dates, destinations and consignees of shipments of fertilizer into the state.

Labeling Requirements: The label, issued by the Director, must show the

name and address of the manufacturer, the number of pounds in the package, date of analysis, the estimated value per 100 lbs. of the fertilizer, and the minimum percentage composition in terms approved by the Director.

Michigan 31

Scope: Commercial fertilizers are defined to include every substance, limestone or lime rock, imported, manufactured, prepared or sold for fertilizing or manurial purposes, the retail price of which is \$10.00 or more per ton.

Registration Fees: The annual registration fee is \$20.00 per brand. The fee must be paid on or before December 31. Tonnage Reports and Fees: Tonnage

reports and fees are not required. Labeling Requirements: In addition to a statement as to weight, brand, and maker, labels must state the chemical analysis. The analysis must show the minimum percentages of nitrogen in available form, potash soluble in distilled water, and available and total phosphoric acid. No other statements of chemical compounds may be made.

Minnesota 32

Scope: Commercial fertilizers are defined to include both mixed fertilizer and fertilizer materials. Fertilizer materials are defined as any substance containing nitrogen, phosphoric acid, potash, or any recognized plant food element or compound which is used primarily for its plant food content or for compounding mixed fertilizer except unmanipulated animal and vegetable manures. Mixed fertilizer includes any combination or mixture of fertilizer materials designed for use or claimed to have value in promoting plant growth, with or without inert materials.

The Commissioner may invoke regulations governing the labeling and distribution of such liming materials as are sold for agricultural purposes, including limestones, slags, burned lime, and hydrated lime. However, such products are not to be deemed fertilizers subject to the registration and tonnage fees.

Registration Fees: The registration fee is \$1.00 per brand. The fee must be paid on June 30 of each year.

Tonnage Reports and Fees: In addition, an inspection fee is imposed at the rate of 5¢ per ton. The fee is based on semiannual tonnage reports covering the periods ending June 30 and December 31.

Labeling Requirements: In addition to a statement as to weight, brand, and maker, labels must state the chemical analysis. The analysis must show the minimum percentages of total nitrogen, available phosphoric acid, and soluble potash.

In the case of bone, tankage, and other natural organic phosphate materials, the total phosphoric acid but not the available must be guaranteed. Unacidulated mineral phosphatic materials and basic slag must be guaranteed and labeled as to available phosphoric acid only, and as to the degree of fitness.

Additional plant food elements may be guaranteed only by permission.

The Commissioner may permit or require the potential basicity or acidity, expressed in terms of calcium carbonate equivalent in multiples of 100 lbs. per ton, to be guaranteed.

Nebraska 11

Scope: The law applies to commercial fertilizers, but does not define the term.
Registration Fees: The license fee is

\$20.00 per brand, payable on or before May 1 of each year.

Tonnage Reports and Fees: In addition, an inspection fee is imposed at the rate of 10¢ per ton. The fee is based on semiannual tonnage reports submitted on or before January 15 and July 15.

Labeling Requirements: In addition to the statement as to weight, brand, and maker, labels must state the guaranteed chemical analysis. The analysis must state the percentages of available nitrogen, available phosphoric acid, and potash soluble in distilled water. A list of all materials used as ingredients must also be shown.

North Dakota³⁴

Scope: Commercial fertilizers include both mixed fertilizer and fertilizer materials. Fertilizer materials are defined to include any substance containing nitrogen, phosphoric acid, potash, or any recognized plant food element or compound which is used primarily for its plant food content or for compounding mixed fertilizer except unmanipulated animal and vegetable manures. Mixed fertilizers are defined to incipde any combination or mixture of fertilizer materials designed for use or claimed to have value in promoting plant growth with or without inert materials.

Registration Fees: The registration fee is \$5.00 per brand, payable on June 30 of

each year.

Tonnage Reports and Fees: In addition. an inspection fee is imposed at the rate of 10¢ per ton. The fee is based on semiannual tonnage reports submitted for the periods ending June 30 and December

Labeling Requirements: In addition to the statement as to weight, brand, and maker, 'abels must show the minimum percentages of total nitrogen, available phosphoric acid, and soluble potash.

In the case of bone, tankage, and other natural organic phosphate materials, the total phosphoric acid but not the available must be guaranteed. Unacidulated mineral phosphatic materials and basic slag must be guaranteed as to available phosphoric acid only, and as to the degree of fineness

Additional plant food elements may be guaranteed only by permission.

The state laboratory department may require or permit the potential basicity or acidity, expressed in terms of calcium carbonate equivalent in multiples of 100 pounds per ton, to be guaranteed.

Ohio 88

Scope: Commercial fertilizers are defined to include any substance or mixture of fertilizer materials or superphosphate, either solid or liquid, including any combination or mixture designed for use in promoting or inducing plant growth. Expressly excluded are unprocessed animal manure, liming materials, inoculants, insecticides and fungicides.

Registration Fees: The license fee is \$50.00 per brand, payable on December 31 of each year.

Tonnage Reports and Fees: In addition, an inspection fee is imposed at the rate of 86 per ton. The fee is based on semi-annual tonnage reports covering the periods ending June 30 and December 31.

Labeling Requirements: In addition to the statement as to weight, brand, and maker, labels must state the chemical analysis. The analysis must show in whole numbers only the minimum percentages of total nitrogen, available phosphoric acid, and available potash.

In bone, tankage and basic slag, unmixed with other material, the phosphoric acid must be claimed only as total phosphoric acid.

If a claim is made for any liming value or of any neutralizing effect in correcting soil acidity either directly or indirectly, labels must also show the minimum percentages of calcium and magnesium and the total neutralizing power in terms of calcium carbonate.

No other form of analysis except the above may be used,

South Dakota 36

Scope: Commercial fertilizers include mixed fertilizer and fertilizer materials. Fertilizer materials are defined to include any substance containing nitrogen, phosphoric acid, potash, or any recognized plant food element or compound which is used primarily for its plant food content or for compounding mixed fertilizers, except unmanipulated animal and vegetable manures. Mixed fertilizers are defined to include any combination or mixture of fertilizer materials designed for use or claimed to have value in promoting plant growth, with or without inert materials.

Registration Fees: The annual registration fee is \$1.00 per brand, payable on December 31 of each year.

Tonnage Reports and Fees: In addition, an inspection fee is imposed at the rate of 20¢ per ton for all commercial fertilizer seld in bulk or in original packages containing more than five pounds. The fee is based on semi-annual tonnage reports covering the periods ending June 30 and December 31. On individual packages of fertilizer of five pounds or less, the distributor must pay an annual inspection fee of \$10,00 per brand at the time of registration.

Labeling Requirements: In addition to the statement as to weight, brand, and maker, labels must state the guaranteed analysis. The analysis must show the minimum percentages of total nitrogen, available phosphoric acid, and water soluble potash.

Unacidulated mineral phosphoric materials and basic slag must be guaranteed and labeled as to available phosphoric acid only, and as to the degree of fineness. In the case of bone, tankage and other natural organic phosphate materials the total phosphoric acid but not the available must be guaranteed.

Additional plant food elements may be guaranteed only by permission.

The Secretary of Agriculture may permit or require the potential basicity or acidity, expressed in terms of calcium carbonate equivalent in multiples of 100 pounds per ton, to be guaranteed.

(Turn to page 91)

Cotton Pest Control Conference at Memphis

Entomologists from the Bureau of Entomology and Plant Quarantine and from nine states in the "Boll Weevil Belt" were to discuss highlights of their 1951 research at the fifth annual Cotton Insect Control Conference at Memphis, Tenn., Dec. 4 & 5.

Cotton farmers and representatives of insecticide manufacturers were also listed on the program, according to Claude L. Welch, general chairman.

The advance program was announced as follows:

Tuesday morning, Dec. 4 · Welcome and introductory remarks · Mr. Welch. "Cotton Insect Conditions and Program During 1951," · M. P. Jones, Washington, entomologist, Federal Agricultural Extension Service.

"Outlook for Necessary Raw Materials," - W. R. Allstetter, Washington, deputy director, Office of Materials and Facilities, Production and Marketing Administration.

"Production Outlook; Industry's Research Program," - Paul Mayfield, Wilmington, Del., assistant general manager, Naval Stores Department, Hercules Powder Co. "Need for Basic Research," Dr. H. G. Johnstan, head, Entomology Department, A&M. College of Texas.

Tuesday afternoon: Eugene Butetr, Dallas, executive vice-president and
editor, Texas Edition, Progressive Farmer,
presiding. "Safe Use of Insecticides,"
- Dr. F. C. Bishopp, assistant chief, Bureau
of Entomology and Plant Quarantine,
USDA, Washington.

Panel discussion - Dr. F. A. Fenton, Stillwater, head, Department of Entomology, Oklahoma Agricultural Experiment Station, panel leader. Dr. F. S. Arant, Auburn, head, Department of Entomology and Zoology, Alabama Polytechnic Institute.

Dr. M. D. Farrar, Clemson, S. C., head, Department of Entomology and Zoology, Clemson Agricultural College, J. C. Gaines, entomologist, Texas Agricultural Experiment Station. A. L. Hammer, State College, associate entomologist, Mississippi Agricultural Experiment Station.

Dr. J. S. Roussel, Baton Rouge, assistant entomologist, Louisiana Agricultural Experiment Station. Dr. E. W. Dunnam, Stoneville, Miss., entomologist, B-EPQ.

K. P. Ewing, Waco, Texas, entomologist, BEPQ. L. C. Fife, Florence, S. C., entomologist, BEPQ. C. R. Rainwater, College Station, Texas, entomologist, BEPQ.

"Applying Cotton Insecticides," S. L. Calhoun, Stoneville, Miss., entomologist, BEPQ. "Pink Bollworm Research and Control," Dr. C. R. Sayre,
Scott, Miss., president and managing director, Delta and Pine Land Co.

Open discussion · K. P. Ewing, leader.

Wednesday morning: Movie ...
"Cotton Insects and Their Control."
Training and Utilizing Cotton Insect Scoute" - Dr. Charles G. Lincoln, entomologist, University of Arkansas.

"Cotton Insect Control on My Farm," - Maury Knowkton, Perthshire, president, Delta Council of Mississippi. "Developing a Continuing Educational Program," - George D. Jones, Raleigh, in charge, Entomology Extension, North Carolina Agricultural Extension Service.

Open discussion led by W. C. Nettles, Clemson, specialist, Entomology and Plant Pathology, South Carolina Extension Service.

Distribution of Entomologists' Conference Report and 1972 State Recommendations.

The conference was scheduled to adjourn at noon, Wednesday, Dec. 9.

The Insect Control Conference was to be followed by a two-day Beltwide Cotton Chemical Weed Control Conference, being sponsored by the National Cotton Council at Memphis Dec. 6-7.

The first day of the conference was to be a working session, open to researchers from land grant colleges, state and federal agencies, and industry, who have been actively concerned in studies of chemical control of weeds and grass in cotton. Results of 1951 research were to be reviewed and general guides for the use of farmers in 1952 were to be compiled.

A summary of weed control research in all the major cotton-producing areas was to be presented at the open session on December 7, final day of the conference.

N. Y. State Conference Attracts 342 Persons to Hear Discussions on

Insecticides & Fungicides

ORNELL University's Fourth Annual Pesticide Application Equipment Conference and the Thirteenth Annual New York State Insecticide and Fungicide Conferences were held at Ithaca, New York, on November 7, 8, and 9. The meetings were scheduled at Bibbins Hall of the Cooperative G.L.F. Exchange. A total of 342 persons registered at the conference, representing 108 commercial organizations, federal and state experiment stations from 17 states and the District of Columbia. Twelve companies, provincial and federal laboratories had representatives from Canada. In addition, representatives, registered from India, Mexico, England, and New Zealand.

The Pesticide Application Equipment program featured reports of research with low-gallonage spraying equipment for row crops and turf. Attention was given to work that had been done with air-blast equipment for orchard pest control and mist concentrate spraying for both orchard and row crops as well as for grape disease control. Discussions of spreader-stickers for mist concentrate spraying and the timing and formulations used in mist blower work for elm leaf beetle control were included. An opportunity was provided to see exhibits of some of the newer application equipment.

The evening program relating to equipment consisted of a panel discussion of application equipment problems as seen from the viewpoint of a canner, a fruit grower, a vegetable grower, and a commercial pest control operator. Guest speakers from these New York State Industries participated in the program.

In addition to materials for disease and insect control, Dr. R. D. Sweet of the Department of Vegetable Crops discussed the topic of "Looking Ahead at Herbicides," and Dr. M. B. Hoffman of the Department of Pomology discussed "Latest Developments in Drop Control on Apples." Forty-two members of the research and extension staffs of the Divisions of Entomology and Plant Pathology at Geneva and its branch laboratories at Poughkeepsie and Fredonia, and from the Departments of Agricultural Engineering, Plant Pathology and Entomology at Ithaca, including the Long Island Vegetable Research Farm, participated in the three-day program.

Dr. G. L. McNew, managing director of the Boyce Thompson Institute at Yonkers, New York, and Ernest Hart, president of the Niagara Division, Food Machinery and Chemical Corporation at Middleport, New York, were guest speakers on the opening morning of the materials conference. Dr. McNew gave an excellent presentation on some of the recent advances and the future of fungicides. Mr. Hart covered the topic of the supply outlook for the National Agricultural Chemicals Association and an analysis of his prediction for the growth of the field of agricultural chemicals in the next five years.

The NAC president said it is apparently the intention of the government to maintain the country on the basis of an arsenal state, which will involve an extension of government planning, higher taxes, probably higher prices, and no doubt a continuation of good business. Undoubtedly, he predicted, this good business will apply to the farmer as well as the industrialist, since food and fiber production will have a high degree of importance in keeping the arsenal state at an efficient peak.

As for the agricultural chemical business specifically, Mr. Hart predicted that the industry could look forward to greater emphasis upon laws and regulations governing use of its products. The future, he believes, will see more attention to toxicology, residue tolerances, new measuring sticks such as taste panels, etc. The industry, he believes, will continue its education successfully, and will learn how to use safely and efficiently the materials which are today giving problems. He looks forward to an expanding list of improved agricultural chemical weapons which may include less toxic phosphates, more potent DDT, odorless and tasteless BHC, improved miticides, etc.

As has been the practice at recent conferences, research workers on the use of pesticides relating to fruit, vegetables, potatoes, ornamentals, greenhouse florist crops, forage crops, and livestock problems gave summaries of the 1951 research work and the extension specialists in plant pathology and entomology summarized and presented their recommendations for disease and insect control for 1952.

Dates for the 1952 meetings were announced for November 11, 12, and 13, 1952.

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CALIFORNIA FERTILIZER ASSN

THE California Fertilizer Association met in Fresno, Calif., November 1, 2 and 3. Theme of the convention was "Fertilizer Influence on California Agricultural Economy." Over 300 persons attended.

James M. Quinn, California Sun Fertilizer Co., president of the association opened the meeting and introduced the executive secretary and manager, Sidney H. Bierly. Mr. Bierly, who has been on the job for the past six months, discussed his ten point program of association activities recently promulgated.

Mr. Bierly reminded the group that the association's legislative committee, under the chairmanship of Earl Mog, Growers Fertilizer Co., has been successful during the past year in getting through the legislature a bill reducing the tonnage tax on fertilizer from 20¢ to 15¢, < a saving of 5¢ per ton to every fertil-

Officers elected at the CFA meeting were as follows:

President: S. B. Tatem, Swift & Co., Los Angeles, Calif.

Vice-president, B. H. Jones, Sunland Industries, Inc., Fresno.

Secretary, Jack Baker, Bandini Fertilizer Co., Los Angeles (re-elected). Treasurer, Wm. E. Snyder, Wilbur-Ellis Co., Los Angeles.

Executive secretary and manager. Sidney H. Bierly, also re-elected.

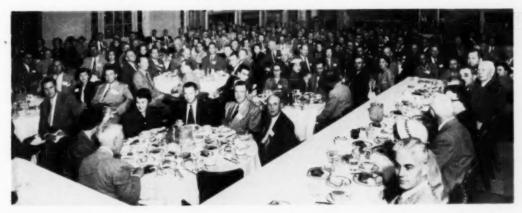
These officers will serve for the fiscal year. October 1, 1951 to September 30, 1952.

izer registrant in the state. This reduction is to become effective January 1, 1952. The association has also been active in attempting to assure adequate attention to agricultural needs for such scarce commodities as sulfur and sulfuric acid. Another association activity has been the raising

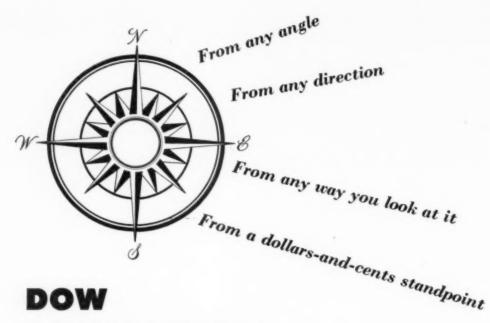
Below: Photo of CFA banquet at Fresno. of a budget of \$9,500 among associate members for the activation of a Soil Improvement Council for the coming year.

Dr. Russell Coleman, president of the National Fertilizer Association, Washington, D. C., addressed the group at luncheon on the first day. He compared soil to a bank, and drew the parallel that one cannot forever keep drawing out of either one without from time to time putting something back in He warned that nationally we are still drawing out of the soil approximately four times more than we are putting back through the medium of fertilizer. This account must be better balanced, he warned, or the soil bank may eventually be broken.

The afternoon session was devoted to the fertilizer and fertilizer raw material supply situation. A number of speakers reviewed various shortages. Ralph Waltz, manager of



DECEMBER, 1951



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the fertilizer department of Wilson & Geo. Meyer & Co., reviewed the sulfur situation, outlining the factors that have contributed to the acute shortage of sulfur and sulfuric acid. California will be 10 to 15% short on superphosphate this year, he predicted. Ned Lewis of Wilbur-Ellis Co., Los Angeles, reported that it seems impossible for organic supplies to meet the demand. He mentioned that a thousand tons of castor meal per month is available and that recovered sewage sludge has added some to the raw material supply.

Big Increase Noted

R. Allen B. Lemmon, chief of the State Bureau of Chemistry, addressed the second convention session the morning of Nov. 2, rendering his report for the year. He noted that consumption of commercial fertilizers in California had increased 25% over 1950 totals, while use of agricultural minerals gained in 1951 45% over the 1950 rate.

Robert Z. Rollins, assistant chief, Bureau of Chemistry, California Department of Agriculture, reviewed "Trends in Fertilizers and Fertilizer Usage in California During 1925-50." He showed a series of charts to illustrate the data which his bureau has collected. During the 25 year period, 1925-50, for instance, usage of commercial fertilizer in California has increased from 90,000 to 640,000 tons, seven times, while the national total has moved from 7 to 18,000,000 tons, or 21/2 times. California now consumes 4% of the national total, as against but one per cent twenty-five years ago.

Mixed fertilizers have constituted between 25 and 50% of the California total tonnage, with an average of 38% over the 25-year period. The plant food equivalent of the mixed fertilizers sold has increased from 17.7% to 25.3% during the 25-year period. Nitrogen content has increased almost 6%. Fish meal once represented about 12% of the total California tonnage. It now represents less than 1%. Use of tankage, bone meal and seed meals has diminished similarly. These and other in-

Table I

Average analyses of the common fertilizer elements in dried,
digested Hyperian sludge as listed by Mr. Parkes:

| % H.O | % Volatile | %N | 01 Pz6 | osphorus Os as P 00% dry | es K ₂ O basis | % Potassium es K | % Sodium es Ne ₂ O | os No |
|----------|---------------|------|--------|--------------------------------|------------------------------|---------------------|----------------------------------|-------|
| 0 | 55.0 | 2.75 | 4.6 | 2.0 | 0.10 | 0.08 | 0.14 | 0.10 |
| | | | | as produ | ced | | | |
| 9.1 | 50.0 | 2.50 | 4.2 | 1.8 | 0.09 | 0.075 | 0.13 | 0.10 |

teresting facts about consumption of fertilizers in California were illustrated in the Rollins report. Agricultural Chemicals will reproduce the complete set of graphs in our next issue.

G. A. Parkes of the City of Los Angeles, also spoke at this session, giving details about construction and operation of "The Hyperion Activated Sludge Plant" which the city of Los Angeles maintains. This plant, which he described as the most modern and largest of its type in the world, is situated close to the waterfront of Santa Monica Bay, occupying a site of 76 acres. The plant is designed to treat an average of 245 million gallons of sewage per day, serving a population of approximately 3,000,000.

At present, about 80 tons per day of dried fertilizer are being produced, but it is expected this will be upped to 150 tons per day shortly, as soon as certain operational difficulties are overcome. Ultimate production will be 220 tons per day. As manufactured at present, the fertilizer is very fine in texture and dusty. This makes the material difficult to handle and has lead to complaints from users. Pelletizing equipment is now being installed, however, to meet this objection.

It is not intended to fortify or enrich this material at the present time. Although the fertilizing constituents in the Hyperion product are low in comparison with manufactured commercial fertilizer, Mr. Parkes reported that excellent results have been reported where the material has been used.

J. Van Overbeek, Shell Oil Co., Modesto, Calif., also spoke at

this session on the subject of "Growth Regulators and Defoliants." Growth regulators, he reminded, can speed up_natural processes as well as retard them. For example: early in spring tomatoes may not set if the night temperatures are too low to permit the process of pollination to take its natural course. Spraying the flower clusters with 4-chlorophenoxyacetic acid will overcome this natural handicap, and fruits will form in spite of cool weather. Pineapples, like tomatoes, the speaker reminded, are often slow and irregular in producing fruit. By using naphthaleneacetic acid the plant can be made to produce flowers and fruit uniformly at any season of the year.

As an example of how growth regulating chemicals can retard natural processes, he cited use of 2,4,5 trichlorophenoxy propionic acid, called TP for short, to prevent preharvest drop of apples, formerly a serious source of crop loss. Also, he noted, potatoes when stored have the undesirable habit of sprouting when the end of their dormant period approaches. This can be prevented by exposing the tubers to the vapors of methyl ester of naphthaleneacetic acid.

Wide Use of 2,4-D

THE most striking growth control chemical of all, and economically the most important, he indicated, is 2,4-dichlorophenoxyacetic acid, widely known as 2,4-D. Many people recognize this compound exclusively as a weedkiller; it is a growth regulator also. At a concentration of a few parts per million it will do an

(Turn to page 97)



TENNESSEE'S FIRST farmer owned co-operative plant-food plant is seen above. Located just south of Nashville, this plant began production of Co-op brand mixed fertilizer late in January, 1951.

Distributed throughout all the counties of Tennessee, Co-Op Brand fertilizer is applied principally to corn, cotton, tobacco and pasture. Like so many leading fertilizer mixers, Co-Op uses Spensol.

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HUGE QUANTITIES OF SPENSOL (Spencer Nitrogen Solutions) are produced each day in plants like this one at Pittsburg, Kansas. Because of its growing reputation for producing well-conditioned fertilizers at low cost, Spensol is in demand.



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J. E. Totman

President, Summers Fertilizer Co., Baltimore, Maryland, and Chairman of the Board, National Fertilizer Association

LTHOUGH we are still in the midst of turmoil and serious times, there is now a little clearer picture of what is before us. Our nation's defense program is now in full operation. Each day we become more nearly invulnerable and less subject to the liability of attack by some aggressor nation. In order to provide full implementation for the defense program and to provide the materials and manpower to produce optimum amounts of the munitions of war, other industrial elements of the nation's economy must of necessity suffer.

Our own fertilizer industry is no exception to this rule. In fact, the industry is particularly unfortunate in that two of its major raw materials—nitrogen and sulfuric acid—are also prime necessities in the manufacture of munitions.

Nitrogen

N ITROGEN, one of our primary plant nutrients, is also the basic element in nearly all modern explosives. Fortunately, our supply of this element is inexhaustible as it comprises four-fifths of our atmosphere. Present production capacity to fix this inactive nitrogen of the air into active chemical forms suitable for use by plants as food, is somewhat taxed to meet current demand. However, private enterprise is expanding present plants and is building additional plants, all of which

will increase production sufficiently to meet presently foreseeable needs. Government defense agencies are aiding wherever possible in such programs by issuing priorities and certificates of necessity in order to facilitate construction. There is no apparent serious shortage ahead for nitrogen-in fact the planting season of 1951-52 should have obtainable at least 5 percent more nitrogen than the previous year. It will not all be just where we manufacturers of fertilizer want it, nor will it be in the forms we prefer. Solid forms of nitrogen will be scarce; the increase will be in the liquid forms.

In order to protect his own operations and to lend his best efforts for the benefit of agriculture, of his industry, and of his country, each fertilizer manufacturer should use every pound of nitrogen in the liquid forms that his output and equipment will permit. Of course he must protect the quality and mechanical condition of his goods and should formulate to that end, but our only hope to meet the demand for agricultural nitrogen this season is to make the most of the liquid forms.

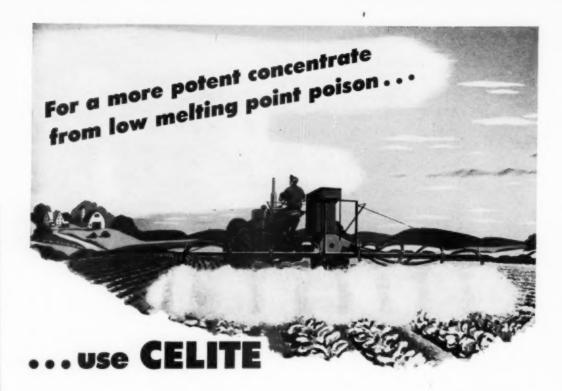
Potash

OUR position as to potash is also reasonably satisfactory. Present estimates of production indicate that we will have some 5 per-

• Delivered Nov. 18 at the 25th Fall Convention, The National Fertilizer Association, Atlanta, Georgia. cent more potash this year than last. These figures include expected imports at last year's rate. Our domestic producers continue to operate their equipment with continually increasing efficiency so as to increase output each year. In addition, two new domestic enterprises have entered the Carlsbad field, one of which expects to begin production in the spring of 1952 and the other some time late in 1952 or early in 1953. Imports may also be somewhat increased depending on the European political and economic situation.

Available Phosphoric Acid

HE report on the supply outlook on phosphoric acid is not as favorable as on the other two plant foods. In my June convention talk I dwelt at length on the sulfur, sulfuric acid and superphosphate problem, and our efforts to reduce shipments of sulfur out of the country. Much has happened since that time. Sulfur and sulfuric acid have been placed under a limitation order and it is quite apparent that the industry will not likely be able to obtain more than 90 percent of the sulfuric acid that it used last year. Fortunately, the industry is not entirely dependent on virgin sulfuric acid made from brimstone, but utilizes large tonnages of acid produced as a byproduct from the smelting of copper, zinc, lead and other metallic ores, and large tonnages of so-called spent



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The presence of only a small percentage of this diatomite powder—because of its great bulk per unit weight, and the irregular shape of the individual particles—fluffs up the final dust. This helps neutralize the effect of heavy extenders—insuring better dispersion of the poison.

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DILUENTS AND GRINDING AIDS

and sludge acids recovered from operations in other industries. Although the fertilizer industry is the largest user of sulfur—in normal times about 20 percent of the total—it ranks still higher as a user of sulfuric acid—in the neighborhood of 35 percent.

Recent attempts to have sulfur exports reduced seem to have met with some success since the export quota for the last quarter has been reduced by 10,000 tons over the previous quarter. Governmental agencies concerned with consideration of our obligations in connection with international economy and particularly with our relations with our allies in South America and Western Europe, have insisted that, for the present at least, this export rate must prevail. At the same time some of these nations are converting to the use of pyrites, but there, as here, because of material shortages, such conversion can be achieved only over a period of many months.

Every effort is being made to conserve and recover all used and waste sulfuric acid in all industries either for concentration or purification and re-use or for use in the fertilizer industry. A number of new installations for the recovery of elemental sulfur from sour gas are now coming into production. Sulfur is also being produced from some of the marginal surface deposits. While all these sources help the situation materially, in total such production will fall far below our shortage for some time to come.

Economics, shortage of construction materials, and the time element are some of the factors that operate against the success of many of the projects proposed for alleviating the sulfuric acid shortage. Sulfuric acid can be made from gypsum at a price. Pyrites could be burned as a substitute for sulfur in making acid, provided we could obtain the pyrites and the furnaces in which to burn them. Either would take a year or more under the present steel emergency.

There has been considerable comment in the technical papers regarding methods for the production

of available phosphoric acid other than by sulfuric acid. The most commonly mentioned process is that of acidulation by nitric acid or mixtures of nitric acid and sulfuric acid, with subsequent ammoniation with anhydrous ammonia. That these processes are technically sound and in some instances definitely proved, cannot be doubted. The problems of materials for construction and operation as well as the economics of the processes in this country remain unsolved. In the first place, such processes require large amounts of stainless steel, a material practically unobtainable under present controle. Large tonnages of construction steel would be required, also a very scarce product.

Operating under what seems to be the most promising of these nitric acid processes, in addition to 2-3/4 million tons of 100 percent sulfuric acid, it would require 1,490,000 tons of anhydrous ammonia to produce the more than 5,000,000 tons of 100 percent nitric acid necessary to manufacture the equivalent in available phosphoric acid of the 12,000,000 tons of superphosphate made last year. There is no surplus capacity for the production of nitric acid, in fact it is now on the scarcity list. New plants would have to be constructed at a cost of about \$150.00 a ton of annual capacity. This would mean an investment of well over \$750,000,000 for the nitric - acid plants alone. The anhydrous ammonia necessary to make this nitric acid is practically equivalent to our total production today and an additional like amount of 1,490,000 tons of anhydrous would be needed to complete the ammoniation of the product. Besides the difficulty of obtaining the construction materials for these new plants, it would be hard indeed to obtain the platinum catalysts necessary for the nitric acid conversion. What I am trying to point out, is that even though these processes have been worked out, it will be 5 years or more before any considerable tonnage can be produced, consequently they provide no prospect of immediate solution of the shortage. I wish also to point

out the terrific impact such a change would make on our industry; practically none of the present superphosphate equpiment could be used and small acidulators could not afford the new type plants. Nitric acid installations, at least at first, would have to be integrated with superphosphate plants as there are practically no tank cars equipped to handle nitric acid. For the present at least we must look elsewhere for the solution of our shortage of available phosphoric acid.

Government Controls

OUR program tomorrow consists of talks by representatives of the four governmental agencies most concerned with production and controls, the U. S. Department of Agriculture, Atomic Energy Commission, National Production Authority, and Office of Price Stabilization. Inasmuch as these men are far more familiar with such matters than I am and much more competent to discuss them, I shall leave the job to them.

Educational Programs

THE Association is continuing its general program along educational lines. "Hunger Signs in Crops" continues to be the most popular book of its type in the field. The Peanut Book is off the press and is now on sale. Many favorable comments have been received on this first authoritative book on this crop. A cartoon booklet entitled "The Conquest of Hunger," is now ready. It tells in pictures and dialogue the value and necessity of chemical fertilizers. Over 100,000 copies have already been distributed at cost. The National Grasslands Program sponsored by the Association has been steadily gaining momentum and is being enthusiastically supported in many regions and states. A new motion picture in connection with the grasslands program is now being produced. We have had prepared, stationery containing six marginal pictures in color illustrating phases of pasture management, which can be imprinted with the individual com-

(Turn to page 96)

Season's Greetings

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58

AGRICULTURAL CHEMICALS

Suppliers' Bulletins

Crushing Equipment Folder

Williams Patent Crusher and Pulverizer Co., St. Louis, Mo., has recently published a comprehensive catalog of its line of equipment for crushing, grinding and shredding. For agricultural limestone, chemicals, insecticides, and various tales, the company's line of equipment is described in detail. Sectional drawings of the "Slugger" and "Super-Slugger" crushers are presented, with charts of specifications in complete form for not only these machines, but also the accessory equipment such as vibrating screens, air separators and elevators. For your copy, write Williams Patent Crusher & Pulverizer Co., 2707 N. Broadway, St. Louis 6, Mo. Ask for "Engineering Bulletin #672."

CSC "Dilan" Booklet

Commercial Solvents Corp., New York, has issued an 18-page illustrated booklet on its insecticide product, "Dilan." The bulletin, printed in color, describes the material itself, its use as a spray and dust, and a complete digest of its physical properties. Methods of formulating are also described in detail. Among the physical characteristics are given the product's breakdown theory, its compatibility, phytotoxicity, analytical technique and residue data. Tables are presented for formulation, application and residue on various crops. Write for the "Dilan" Bulletin, Commercial Solvents Corp., 17 E. 42nd St., New York 17, N. Y.

Scale Bulletin Offered

Exact Weight Scale Co., Columbus, Ohio, has issued a new bulletin describing its line of sacking scales and accessories. The four page folder is printed in color and pictures the various items produced by the company. Among these are the "under and over" weight dial, and various fittings to lend flexibility to sacking operations in fertilizer and insecticide plants. Write for Bulletin #3268, Exact Weight Scale Co., 944 W. Fifth Ave., Columbus 8, Ohio.

Conn. Ag. Sta. Booklet

Connecticut Agricultural Experiment Station, New Haven, has published a 72-page booklet containing the proceedings of its 75th anniversary observance of last year. Included in the booklet are the complete texts of talks presented at the celebration, photographs of the present station facilities and those preceding it; and a list of delegates attending the event.

Armour Booklet Issued

Armour Research Foundation of Illinois Institute of Technology, Chicago, has issued a recent colorful brochure describing its research activities in many fields, including chemistry and biochemistry. A complete description of the Institute's personnel, its officers, and a list of its supporting companies is given. The Institute is located at 35 West 33rd St., Chicago 16, Ill.

Chase Bag Organ Issued

The house magazine, "Bagology" for October, 1951, has been issued by Chase Bag Co. It contains a considerable amount of information on bags, as well as tid bits of wit and wisdom in the order of a scrap book. Copies are available from the firm's general sales offices, 309 W. Jackson Blvd., Chicago 6, Ill.

Hough Pictures Product

"Profitable Production With Payloaders" is the title of a new 12-page colored brochure issued by the Frank G. Hough Co., Libertyville, Illinois. The booklet shows bulk material handling applications of the "Payloader" and lists users in specific industries, such as the fertilizer and chemical industries.

Fifty actual on-the-job photographs have been used to illustrate the catalog. Write for catalog 205, care of the company, 743 Seventh St., Libertyville, Ill.

Battelle Booklet Out

Battelle Memorial Institute, Columbus, Ohio, has recently published a comprehensive booklet describing in detail its work, facilities and history. Numerous photographs, drawings and charts are presented to give the reader a good insight of the workings of the institution.

The institute opened in 1929 with a staff of 20, the booklet says. At the end of five years, sponsored research totaled some \$80,000. In 1951, however, this figure has grown to \$9,000,000 annually.

Actually, the book is a pictorial tour through the entire plant with introductions to key personnel along the way. A limited supply of copies is available.

"Monsanto's Fifty Years"

A fiftieth anniversary issue of Monsanto Magazine has just been produced by Monsanto Chemical Co., St. Louis, Mo. Far from being stodgy, the 36-page publication is full of pictures showing "before and after" sequences, reminiscences of Monsanto people and a high-spot recording of the progress made during the first half of the 20th century.

The company's contribution to greater agricultural production is outlined, with special emphasis being placed on its DDT, 2,4-D and 2,4,5-T products for insect and weed control.

President A. C. Thomas is author of an editorial, "The Next Fifty Years" at the end of the book, to give the reader a look ahead.

Du Pont Reports on Development in Control of TOBACCO BLUE MOLO

FERMATE® used regularly prevents blue-mold attacks, and stops spread of the fungus if it has already sneaked in a plant bed. It boosts yield of healthy plants so well that many growers have been able to cut plant-bed yardage in half. Helps grow-

ers produce strong, fast-growing plants. This same product is also ideal for control of apple and pear scab, peach and cherry brown rot, cherry leaf spot, grape black rot, raspberry anthracnose and many other fungous diseases. In all its many uses, "Fermate" combines effective fungous control with mild action on the plants, so that the crop attains the full vigor of normal growth.



PARZATE® has proved a seffective against tobacco blue mold as it has against tomato and potato blights and other fungous diseases of important crops. The lighter-colored residue is sometimes preferred by tobaccomen. "Parzate" helps produce

sturdy, hardy plants that do well after transplanting.

"Parzate" and "Fermate" fungicides are two of many Du Pont products for the farm which have found a variety of important uses. The long-time research to develop these products, plus the extensive field experimentation to determine their best uses, is typical of the development of Du Pont chemicals for better pest control.

DU PONT CHEMICALS FOR THE FARM INCLUDE: fungicides: PARZATE® (Liquid and Dryl, PERMATE,® ZERLATE,® Copper-A (Fixed Copper), SULFORON® and SULFORON®. Wentable Suffurs..., Intercirides: DEENATE® DIT, AMBLATE® Methaxy-tolor, LEXCONE® Benzene Haccockorides, KERSHITE® Distinct Spray, EPN 300 Inserticide. Calcium Arsenate, Load Arsenate... Wood and Brush Killers: AMMATE,® 2,4-D, TCA and 2,4,5-T... Albo: Du Pant Cofton Dusts, Du Pont Spreader Stricter, PARMONE® Fru Drop-Inhibitor, and mony others.

On all chamicals always fallow directions for application. Where warning or coution statements on use of the product are given, road them carefully.



BETTER THINGS FOR BETTER LIVING

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AGRICULTURAL CHEMICALS

Technical Briefs

2 New Hyman Products

Data sheets covering two promising new insecticidal chemicals which are still in the testing stage have recently been released by Julius Hyman & Co., Denver. The two new materials have been designated provisionally as "Compound 269" and "Compound 711,"

Toxicity of Compound 269 to a number of destructive insect species is reported to be "considerably greater than that shown by several standard commercially available insecticidal compounds." Exceptionally small doses of this new insecticide are said to give effective field control of Lepidoptera such as the southern armyworm larvae and of Homoptera such as leafhoppers, pea aphid, bean aphid and scale insects. Residual activity appears to be of long duration, comparable to that of dieldrin or DDT

Compound 711 is said also to show an unusually high degree of toxicity. Small doses have, under test conditions, given effective field control of Lepidoptera such as southern armyworm and European corn borer larvae, of Hemiptera such as the large milkweed bug, and of Homoptera such as aphids. Residual activity of Compound 711 falls somewhere between that of aldrin and dieldrin. Speed of action appears to be as fast or faster than aldrin.

Samples of both new materials have been available over the past growing season to federal, state and university entomologists in quantities sufficient for extensive field testing. Results of their experimental findings will be coming before various technical groups in the entomological field in the near future.

Peas, Lime & Fertilizer

Lime and fortilizer experiments on peas for canning and freezing were conducted in Maine over the 4-year period, 1947-1950.

On acid potato soils applica-

tion of 300 to 400 pounds of finely ground limestone per acre down the drill spout with the pea seed was found to be as effective in increasing yields as 1,000 to 3,000 pounds applied broadcast. Applying small amounts of lime with the seed has become a standard practice in improving pea yields on potato soils and at the same time minimizing the chances of potato scab becoming troublesome.

No yield response of peas to phosphorus and potash was found on soils containing medium to high amounts of these elements accumulated as residues from potato fertilizers. No experiments were located on soils testing low in available phosphorus and potash.

Yield response to nitrogen fertilizer tended to be greater on soils having too low a lime pH level for good growth of legume bacteria. At higher, more optimum pH levels, or where lime was applied with the seed, the effect of nirtogen on yields of shelled peas was erratic. In most experiments nitrogen did not increase yields of fancy grade peas. At later dates when the peas had passed the quality stage for a fancy pack, yield differences for nitrogen were generally greater.

In most experiments application of nitrogen delayed maturity and kept peas in a fancy grade 1 to 2 days longer on the average.

Nitrogen increased the height and yield of pea vines and weed growth in all experiments.

—"Yield and Quality of Peas for Processing as Affected by Lime and Fertilizers," by G. L. Terman and H. J. Murphy, Maine Agricultucal Experiment Station, before 1951 meeting of Amer. Society of Agronomy, State College, Pa.

Residues Studied

An extensive study was made of insecticide residues on lettuce over a period of 2 years. Residue analyses were made at the time of the last application and at intervals until harvest on lettuce plants treated with various formulations of parathion or DDT which were applied.

Spray deposits of DDT immediately following the last application were usually larger in those plots receiving a greater number of earlier sprays. Parathion was less consistent, probably because of the more complete disappearance of the accumulated deposits from the earlier sprays. The residues at harvest followed the same pattern.

For the samples from plots that received an equal number of spray applications it was found in the majority of the tests for both parathion and DDT that a higher final residue at the time of the last application resulted in a subsequently higher harvest residue.

A shorter interval between the last application and harvest, for those samples that received an equal number of applications, increased the harvest residue consistently when D-DT oil emulsion was used, and less consistently with DDT and parathion wettable powder spray treatments.

Rain within a day after application caused a marked reduction of the deposits of both DDT and parathion sprays. Greater accumulated rainfall between the last application and harvest, for those samples that received a similar number of applications, gave lower harvest residues in most of the DDT spray plots, but was less consistent in the parathion spray plots where losses from other sources were greater.

Most of the residues at harvest were found on the lower leaves which are left in the field when the lettuce heads are cut for market. The highest DDT residue found on market heads when applications were continued up to 11 days from the harvest date was less than 1 ppm. When DDT treatments were continued as late as 4 days before harvest, however, residues up to 5.4 ppm occurred on the market heads. The highest parathion residue found was 0.14 ppm, which occurred on a sam-



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ple treated only 4 days before harvest.

—Summary of "Residue Studies on DDT and Parathion Applied to Lettuce for Control of the Six-spotted Leafhopper," by M. J. Sloan, W. A. Rawlins and L. B. Norton, Cornell Univ. in Journal of Economic Entomology, Vol. 44, No. 5, October, 1951.

Fertilizer on Wheat

For 10 years, experiments upon supplemental fertilizing of wheat have been conducted on several soil types. These field experiments are located on farms upon soils of different fertility levels. They are designed to determine the most desirable grade, amount, time and method of applying fertilizers for this crop. Each experiment consists of from 10-16 different treatments, each treatment replicated four times. Various amounts of nitrogen, phosphorus and potassium have been compared. Fall vs. spring applications have been compared. The responses have been studied in the light of pest practices and soil analyses. Sixty complete field experiments have been conducted during the 10-year period.

Yields have been measured every year and in some instances chemical analyses and vitamin content of the grain have been determined.

An adequate supply of available nitrogen in the spring is the chief requirement for large yields, often producing increases of from 5 to 20 bushels. A program of wheat fertilization for Pennsylvania has been worked out as a result of these experiments. It consists of a starting fertilizer applied at drilling time supplemented by sustaining treatments, the latter chiefly nitrogen applied early in the spring.

Fertilizing has produced small differences in the composition of the wheat grain with the exception of nitrogen which always increases the protein content. Different soil types do, however, have considerable influence on grain composition.

"Experiments on the Fertiliza-

tion of Wheat in Pennsylvania," by F. G. Markle, Pennsylvania Agricultural Experiment Station, before Amer. Society of Agronomy, State College, Pa., 1951.

Fly Resistance Studied

Studies have been conducted to determine the mortality and knock-down of house flies, Musca domestica L., exposed intermittently to small amounts of DDT residues.

Two 10-minute exposures at 7-hour intervals each day for 3 days to 0.2 mg. of DDT per square foot caused 37 per cent mortality of nonresistant flies, whereas six 10-minute exposures in 1 day killed 87 per cent. A similar mortality trend was obtained with resistant flies, but the differences between treatments were not so pronounced as with nonresistant flies. Since the mortality decreased as the time between exposures was lengthened, it is believed that the flies were able to detoxify themselves or otherwise reduce the effect of the poison.

Flies that survived the twicea-day exposure were killed much more easily than untreated flies when subsequently exposed to a higher dosage of DDT. These results indicate that DDT or a toxic byproduct accumulates in the flies.

Knock-down tests with nonresistant flies showed that the total exposure time required to effect knock-down also increased as the time interval between exposures was lengthened.

In tests with radioactive DDT specimens of resistant flies exposed intermittently for a total of 7 hours had an average reading of 18.3 cpm (counts per minute) with a 16 per cent mortality, whereas the flies exposed continuously for the same period had a reading of 16.3 cpm and a mortality of 45 per cent. Survival was therefore higher among the flies allowed rest periods between exposures, although the total amounts of DDT absorbed were similar in both lots.

—Summary of "Fly Control Experiments in Massachusetts in 1950" by Steve Moore, A. R. Toczydlowski and H. L. Sweetman, Univ. of Mass., in Journal of Economic Entomology, Vol. 44, No. 5, October, 1951.

Factors Affecting IPC

Isopropyl N Phenyl Carbamate (IPC) is gaining considerable acceptance as an herbicide in certain regions. It has proved valuable for the control of weedy annual grasses in legumes and certain other crops. Moreover, it has shown some promise for the control of certain perennial grasses.

Investigations with IPC have proved this chemical to be a valuable adjunct to the herbicide field. However, to attain maximum effectiveness with this chemical, it is necessary to have certain specific conditions for its use. Studies on factors that have influence on the effectiveness of this chemical have shown:

 That it is subject to biochemical specificity and is more actively effective on species of festuccideae than panicoideae.

 The residual activity of this chemical is important in achieving the control of young seedling plants and the loss of this activity is in a large measure due to an attack by microorganisms.

 Since IPC is a mitotic poison, it is most effectively used against germinating seeds and very young seedling stages.

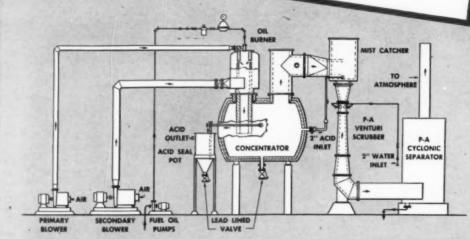
4. Moisture is essential to bring the IPC into intimate contact with the plant to be controlled, but moisture with high temperature may result in more rapid destruction of the chemical. As a consequence, this chemical has proved more effective for the control of winter annuals by reason of its use during periods of cooler weather at a time when activity of the microorganisms is low.

5. The control of perennial grasses with IPC presents a different problem than the control of annual grasses. This problem necessitates:
(a) Application of the IPC in oil, which serves as a vehicle to carry the IPC into the plant and (b) cultivation to assure intimate contact of

(Turn to page 95)

CHEMICO High Temperature Concentrator

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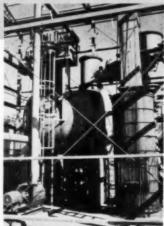


This new Chemico High Temperature Concentrator of the Gates Bres., Inc., Wendell, Idaho plant has a daily output of 60 teas of 50 per cent phospheric eating per day, calculated as P₂O₄.

The Chemico phosphoric acid concentrator is especially adapted for the production of high strength phosphoric acid and triple superphosphate. It offers two major advantages. (1) It uses combustion gas at 2500F which accounts for its high heat efficiency (90+%). (2) It produces a very small volume of gas to be scrubbed at the concentrator exit.

Here's how it works: Hot combustion gas is released under the surface of the acid where it gives up most of its heat and emerges at a temperature slightly above that of the acid itself. The combustion of the fuel takes place in a dip pipe, specially designed to withstand high temperature on the inside and the corrosive action of the acid on the outside. Exit gases pass through a Pease-Anthony Venturi Scrubber which eliminates acid mist with 99+% efficiency.

If you are thinking of producing triple superphosphate or phosphoric acid by the wet process, it will pay you to ask Chemico for specific recommendations.



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The Listening Post

Use of Chemicals in Eradication of Potato Wart

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey Bureau of Plant Industry, Soils, and Agricultural Engiseering, U. S. Department of Agriculture, Beltaville, Md.



By Paul R. Miller

ISCUSSING potato wart, R. E. Hartman, of the Pennsylvania Bureau of Plant Industry states that since September, 1918, the time when the disease caused by the fungus Synchytrium endobioticum was first found in the United States, it has been considered a menace to potato production in this country. For many years before, it had been prevalent in the principal potato-growing countries of Europe and the British Isles. Severe losses occurred in many potato fields of Europe, and the disease was regarded by English authorities as one of the most serious. In 1909, this disease was reported from Newfoundland, and soon thereafter State and Federal authorities in the United States took precautionary measures to exclude it from this country. In 1912, the Federal Horticultural Board established a quarantine on importation of potatoes from Europe and other areas where this disease was prevalent, but the disease evidently had arrived the preceding year and was established in a few mountain counties in Pennsylvania, Maryland, and West Virginia.

Potato wart is still confined to the very small area from which it was first reported, owing to the strict regulations applied to the importation of foreign potatoes, as well as a ban on growing potatoes in the infested areas. The early finding of immunity in some well-known varieties, and now in many of the newly developed seedlings, has also helped in the controlling of the disease. In addition, its establishment is controlled by mean soil temperature and to some extent by moisture relationships. There are, however, large areas in the United States with a climate similar to that of the districts of Pennsylvania, Maryland and West Virginia in which wart has already been found, and unless precautions are continued and wart eradicated from infested areas it could be spread to other sections.

Control in Pa.

STRICT quarantine regulations are essential, of course, but fundamental studies on the disease are also required for permanent control according to Dr. Hartman. He explains methods used to eradicate the disease and summarizes the results of the Pennsylvania investigations as follows:

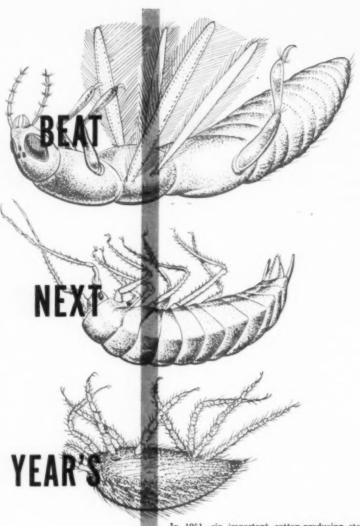
The potato wart problem in Pennsylvania has received continuous experimental study in addition to the maintenance of a strict quarantine in all known infested areas since 1918. The quarantines governing the growing of potatoes, inspection of crops grown, and regulation of the movement of root crops from infested areas, have endeavored to prevent the spread of the disease to other areas and by prohibiting the planting of non-immune potatoes in infested gardens to hasten its elimination by starvation.

Summary of Study

7 ART investigations up to 1950 establish the following conclusions—(1) soil temperatures are a limiting factor in the development of the disease, i. e., wart will not establish itself in areas with mean soil temperatures of 70°F, or higher, (Such mean temperatures are found in areas with a growing season of 140 days or longer) (2) resting spores of the organism are capable of remaining alive in the soil for a long period, 20 to 25 years, in heavy sods, meadows, and abandoned weed patches. However, the organism, in the absence of susceptible host plants, disappears rather rapidly in sandy soils, or, if fallow or semifallow culture is practiced, possibly within ten. years; (3) wart spreads very slowly, i. e., through transportation with infected host tissue, contaminated soils, etc.; (4) unless wart is entirely eradicated it quickly re-establishes itself under garden culture if susceptible kinds of potatoes are planted; (5) immune potato varieties (in the sense that they do not propagate the disease) now under certification include Spaulding Rose, Cobbler, Green Mountain, Katahdin, Mesaba, Mohawk, Sequoia, Warba, Ontario, Pawnee, Kennebec, Chicago, Calrose, and Red Warba; (6) soil sterilization or wart eradication can be achieved by (a) ammonium sulfo-cyanate applied at the rate of 2500 pounds per acre to old infestations, which eradicates the disease provided the organic content of the soil is low or diminished by cropping, or (b) either or both finely pulverized copper sulfate at the rate of 2500 pounds per acre or a 5 percent solution of 40 percent formeldehyde at the rate of 20 gallons per 100 square feet, which have been found to be the most practical and effective wart eradicants and are now used exclusively in Pennsylvania.

Wart Eradication

W ART eradication from 1932 to 1946 inclusive, was a slow, hand operation. Gardens were spaded, cultivated, and then wart-eradicated by the application of copper



PESTS

In 1951, six important cotton-producing states recommended TEPP for control of aphids, and four of these also recommended it for mites as well. Generally, one half pint of 40% TEPP to the acre was suggested.

Louisiana, Mississippi, New Mexico and North Carolina recommended TEPP for aphids and mites. California and Georgia recommended it for aphids. These are important markets for Monsanto Nifos-T (TEPP) next year. This is the time to get ready for them.

Dozens of other insect enemies of crops can be whipped to a frazzle by Nifos-T, properly formulated and correctly applied. Nifos-T is available now. For information on the use of Nifos-T in dusts, sprays and aerosols, contact the nearest Monsanto Sales Office or write MONSANTO CHEMICAL COM-PANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.

NIFOS-T



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sulfate at the rate of 2500 pounds per acre. The chemical and sawdust mixture was thoroughly worked into the soil by garden cultivators.

To overcome the handicap of slow operation and to increase the rate of eradication, this project in 1947 was supplied with mechanical equipment including tractors, plows, discs, trucks and 600-gallon power tanks and chemical (lime) spreaders.

A review of eradication efforts for the 1950 season showed that the disease had been eradicated completely from 440 infested gardens, 333 were treated and undergoing check planting, and the balance of 340 infected gardens in 11 remaining infected villages to be eradicated during the 1951 and 1957 period. (Table 1, page 69.)

Wart eradication has now a definite pattern or method and final elimination of all presently known infections should be completed by 1957 under one of the following methods:

 Destroyed—A total of 180 gardens were destroyed by mine operations; i. e., strippings, cave-ins, etc. This number may be increased by continuing mine operations.

(2) Total Destruction-Many infested gardens were abandoned as a result of mine operations or evaluated due to depletion of coal deposits; such areas are totally destroyed by excessive applications of copper sulfate. These abandoned gardens in most cases have been unused for years and are found to be overgrown with brush, and weeds, and covered with accumulated rubbage. These areas are carefully cleared of all brush, weeds, etc., then plowed and disced to facilitate thorough applications of copper sulfate. The cultivated portions of abandoned gardens are treated with pulverized copper sulfate by mechanical spreaders at the rate of 10,000 pounds per acre, and the berms and abandoned foundations are treated with copper sulfate solution at the rate of 8,000 pounds per acre.

(3) Standard Eradication— This method is applied to infected gardens which are used by owners

or tenants as vegetable patches. It has three phases: (a) The cultivated portion of the garden is plowed and disced and copper sulfate applied at the rate of 2500 pounds per acre by mechanical spreaders. (b) The berms are cleared of brush, weeds, rubbish, then subsoiled, and totally destroyed by copper sulfate solution applied at the rate of 8,000 pounds per acre. (c) Lawns, flower beds, shrubs, and trees are treated with a 5 percent solution of 40 percent formaldehyde applied at the rate of 20 gallons per 100 square feet. After eradication, the cultivated portion of the garden is check-planted with susceptible Russet Rural potatoes for a period of four successive years.

(4) Spot Treatment Eradication-This eradication method is used in gardens known to have been infected, but in which non-immune potatoes have been cultivated for at least 20 years. It is accomplished in three phases: (a) The berms are cleared and totally destroyed with copper sulfate solution applied at the rate of 8,000 pounds per acre. (b) Lawns, flower beds, shrubs, and trees are treated with a 5 percent solution of 40 percent formaldehyde at the rate of 20 gallons per 100 square feet. (c) The cultivated portion of the garden is plowed, disced, and planted to susceptible Russet Rural potatoes. In the fall these plantings are carefully harvested to determine the presence or absence of potato wart infection. This check planting is continued for four years. If no infection is found during this peirod of check planting the garden is considered free of wart. If a few individual hills are found infected, the area around each infection (20 square feet) is sterilized by application of 10 percent formaldehyde solution at the rate of 2 gallons per square foot. The garden is then continued under check planting. However, if wart is found in 5 percent of the plantings this method is discontinued and the garden is treated by standard eradication methods.

(6) Check Planting—Under standard and spot treatment eradication, all treated gardens are checkplanted with susceptible Russet Rural potatoes for a period of at least four years under the following rotation: The first year the whole cultivated garden is planted; the second and third year alternate halves of the garden, and the fourth and final year the garden is again check-planted.

(7) Sanitary Precautions in all eradication work the necessity for keeping all equipment and personnel attire sterile must receive constant vigil, to prevent spreading the disease within the infested area or to non-infested areas. This is accomplished by sterilizing all equipment, boots, and oilskin coveralls with a 10 percent solution of 40 percent formaldehyde, using high pressure spray tanks equipped with extension hose and special spray nozzles. This sterilization is maintained from the start of eradication, through planting, cultivating, spraying, and harvest operations.

Potato Wart in 1951

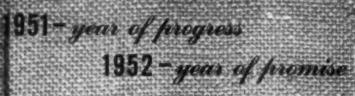
THE length of the eradication process and the importance of constant supervision of infested areas is shown by reports from Maryland and Pennsylvania.

In Maryland, according to R. A. Jehle of the Maryland Agricultural Experiment Station, one warted potato of the susceptible variety Marygold was found on August 28 in a garden at Klondike, Alleghany County. Potato wart, was first observed in this garden in 1921. It was quarantined at that time along with other gardens in which wart had been found, and the immune variety Irish Cobbler was planted from 1922 to 1946 inclusive under the supervision of the State Plant Pathologist. From 1947 to 1951 inclusive susceptible varieties were planted to determine whether the wart organism had been eradicated from the soil. All of the potatoes grown in this garden were examined every year and this is the only warted tuber which has been found.

In Pennsylvania, Russell Hyre reports several infections in previously infested gardens that had been



Janus, ancient Roman deity whose two faces symbolize past and future.



1951 was a year of achievement for Aldrin and Dieldrin. The dramatic airplane shipment of 13 tons of Aldrin from Denver to Iran for locust control, and the brilliant results gained, highlight a year that saw Aldrin and Dieldrin win unqualified acceptance as outstandingly economical and effective insecticides for control of grasshoppers and boll weevil and many other cotton pests. The progress of the past year holds promise for a wider field of usefulness for these proven chemicals in 1952.

GRASSHOPPERS—At the incredibly low dosage of two ounces to the acre Aldrin gave the "performance of the year" in grasshopper and locust control in the United States, Canada and the Middle East.

COTTON PESTS—Aldrin and Dieldrin were two of the most widely used and effective insect toxicants employed in the South to control boll weevil, thrips, cutworms and other cotton pests, thus helping attain the national goal of 16 million bales of cotton.

ANTS—Dieldrin has been recommended for the control of the Red Harvester Ant in Bulletin EC-18, BE&PQ, USDA.

Registration is being sought for the use of Aldrin and Dieldrin insecticides against a greater variety of insect pests. Some of these in control of which experimental field use of Aldrin and Dieldrin showed superior performance in 1951 are:

- 1. SOIL PESTS—This is almost a virgin field for the use of insecticides and promises a large market. Aldrin and Dieldrin in economical dosages have demonstrated their effectiveness in much needed control of many species of subterranean insects. Such control consistently has resulted in increased yields and improved quality of crops.
- 2. FLIES AND MOSQUITOES Dieldrin has been extensively and successfully used experimentally for control of flies in barns, in cattle and hog feed lots and in community clean-up campaigns. In a recent authoritative article on the toxicity of several well-known organic insecticides to anopheline

mosquito larvae Dieldrin is referred to as "The most toxic of all the compounds tested, both as an oil solution and as an emulsion."

Revolutionary new techniques for the application of Dieldrin for fly and mosquito control have been devised. Briefly these may be referred to as:

- (a) Strip Method for Fly Control which consists of treating strips of wire screen with an insecticide. A report on this method says, "The strips treated with Dieldrin gave outstanding results, controlling flies throughout the fly season."
- (b) Dieldrin-Bentonite Granules for controlling mosquitoes were used with amazing success in Arkansas rice fields. A bulletin describing this sure, low cost formulation reports, "Dieldrin was more toxic and retained its toxicity better when exposed to weathering in the field than the other insecticides tested."
- PLUM CURCULIO—In experimental field work in controlling this serious fruit pest both Aldrin and Dieldrin have been extremely effective.

It is possible here to give only a glimpse of some of the new markets projected for 1952. Wherever the war is being waged against harmful insects in the interest of greater production of food, feed and fibre crops and of the public health, Aldrin and Dieldrin will be at the front.

Get the facts. Write for information and data concerning the use of these toxicants for your insecticide program for the new year.

Deslies HYMAN & Company

Shell Statistical Commission Statistical Statistical

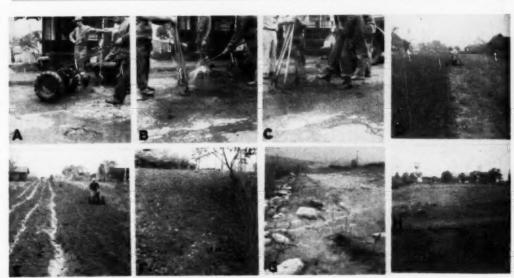
treated, and one new and severe infection. Over 95 percent wart was found in a small garden of potatoes near Freeland, August 20. It was obviously early, severe stoloniferous infection since very few tubers even started to form. Rank top growth on the manured fertile soil gave no indication of the wart present underground.

There were several unique features about this case. (1) This was the most complete destruction by wart ever observed by Dr. Hartman in all his work with this disease. Prior to this year he hadn't been able to approach closely this amount of infection the first season, even after planting tubers in soil known to be heavily infested. However, cooler average soil temperatures this summer favored early infection. (2) This garden was under state inspection the last three years when susceptible Russet Rural potatoes were grown and no wart was found. (3) This garden was in a new section that was

Table I
Progress of potato wart eradication in Pennsylvania, 1932 to 1957.

| | | Ye | ar | |
|--|-----------|----------|----------|---------|
| Total Number | 1932 | 1942 | 1947 | 1950 |
| Infected gardens | 937 | 1,073 | 1,111 | 1,113 |
| Infected towns and villages | 100 | 108 | 108 | 108 |
| Infected counties | 12 | 15 | 15 | 15 |
| Infected gardens eradicated | 0 | 229 | 375 | 440 |
| Infected gardens under eradication | 0 | 42 | 49 | 333 |
| Infected towns and villages eradictaed | 0 | 21 | 25 | 34 |
| Infected towns; and villages under eradication | 0 | 5 | 10 | 63 |
| Remaining infected gardens | 937 | 804 | 736 | 340 |
| Remaining infected villages | 100 | . 82 | 73 | 11 |
| Wart eradication summary 1932 to 1958 W | art eradi | cation 1 | 932 to 1 | 950 |
| Total number of gardens 1,113 Ammor | nium Thi | -Cyanate | e 50,0 | 000 Lhs |
| Mine Operations 180 Copper | Sulfate | | 475,0 | 000 Lbs |
| Total Destruction 181 40% F | ormaldeh | yde | | 10 Bbb |
| Standard Eradication 372 | | | | |
| Spot treatment 380 | 1941-1 | 957 (Es | timate) | |
| Copper | Sulfate | | 150,0 | 00 Lbs. |
| TOTAL 1,113 40% F | ormaldeh | vde | | 10 Bbls |

developed from brush and woodland some 15 years ago. Thus the organism had arrived at this garden site presumably from some nearby infected garden since the control program was first put in effect in 1932.



1. A — Sterilizing a small garden tractor before proceeding to the next garden. B—Sterilizing hand tools used in planting potatoes. C — Sterilizing workmen's footwear after planting a garden. D — Plowing a garden for planting. E — Furrowing, fertilizing, liming, and planting Russet Rural potatoes. The story of this garden to date is as follows: 1949 — Garden was clear-

ed and plowed berm was totally destroyed. 1950—Wart Immune Irish Cobblers were grown, harvested and garden given standard treatment in the fall. 1951 — Garden was plowed, fertilized limed, and wart susceptible Russet Rural potatoes planted. Susceptible potatoes will be planted three more years — a total of four years. F — A treated garden just planted with wart

susceptible Russet Rural potatoes — some schedule as with garden shown in Figure 1. E. G-H — Two views showing lack of plant growth on garden areas totally destroyed with copper sulfate about four years before. Lack of rainfall resulted in a high concentration of copper sulfate for some time and a thorough job of eradication.

Now there was a recommendation!



Marco Polo advised the camel drivers...

... to use crude mineral oil on their camels for the mange. It seems that back around the year 1290 the faithful "ship of the desert", always a mangy animal at best, was having a little more trouble than usual. That humped-back supply line so vital to Arabia was beginning to bog down.

Marco Polo gathered the grizzled drivers about him and extolled the wonders of crude mineral oil—a primitive recommendation but those were primitive times. Today's agricultural authorities have a wide choice of compositions at their command whether the infestation concerns livestock or crops. Such organizations as Geigy Company, Inc. are mobilized to formulate products which will meet the most exacting requirements and conditions.

Therefore, whatever your requirements remember that Geigy Company, Inc. represents the highest standards of quality, dependability and service.

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Insect Activity Slows Down For Winter

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is connected with the department of Insect Pest Survey and Information. Agricultural Research Administration. Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the United States.

La la

By Kelvin Dorward

OLD weather early in November reduced insect activity considerably throughout most of the United States. Southern Florida was the only section from which bean insect activity reports were received. The bean leaf roller and southern green stink bug were locally numerous in that section. Light populations of the potato leaf hopper were present on beans. Tomatoes were infested by a number of pests including the southern army worm, tomato fruit worm, serpentine leaf miner, wire worms, and stink bugs. Horn worms were also present on eggplant. Cabbage caterpillars were reported present on cole crops in Virginia, South Carolina, Georgia, Florida, and Alabama. Aphids were also present on most cole crops in those states, doing but little damage. In Virginia, however, the green peach aphid damaged spinach. This crop in Virginia was also damaged by what was believed to be the cabbage looper. In early November, pickle worms were still present in moderate populations on squash and cucumber in South Carolina and the melonworm on wild cucurbits in Florida. The southern green stink bug continued numerous on cowpeas in Georgia. Lygus bugs were light to moderate on carrots and lettuce in South Carolina.

Pink Bollworm in Calif.

Live pink boll worms were found on two occasions during recent weeks in trash on cotton picking machines shipped from Texas to California. The first find was on October 23 by Kern County inspectors. The second find was November 2, when

another was found in trash removed from a machine which had been harvesting cotton for approximately three weeks in Kern County. Both machines had been shipped from the pink boll worm infested areas of Texas and had been steamed cleaned. In view of these findings, California authorities recommended the fumigation of all or as many as possible of the used cotton harvesting machines brought into California this season. California has amended its quarantine regulations requiring that hereafter used cotton picking machines must be fumigated prior to entering the state. Arizona now has identical requirements.

It should be pointed out that the only pink bollworms found in California were those found in trash on cotton picking machines brought into the state from infested areas elsewhere.

The eleventh annual Tobacco Insect Conference was held at Clemson, S. C. on October 9 - 11, in furtherance of its announced purpose of promoting a better coordination of research on tobacco insects being conducted by State and Federal organizations. W. C. Nettles, Extension Entomologist of South Carolina, was Chairman. This conference was a part of the general Tobacco Workers Conference held in conjunction with the agronomists, plant pathologists, and agricultural engineers.

A total of 98 persons registered at the Entomology sessions, including research entomologists, extension workers, and representatives of the tobacco and insecticide industries, according to a report by D. J. Caffrey, Ass't. Division Leader, Div. Truck Crop and Garden Insect Investigations, B. E. P. Q.

The general subjects discussed by the entomologists included: (1) the latest information on the control of aphids, budworms, hornworms, wireworms, flea beetles, and green June beetle larvae as pests of tobacco in the plant bed and in the field, and on the control of the cigarette beetle and tobacco moth in stored tobacco, (2) the status of biological, ecological, and cultured control of tobacco pests, (3) surveys in relation to tobacco insect control, (4) the insecticide residue problem on tobacco, and (5) extension problems in tobacco insect control.

Special attention was devoted to a panel discussion on residues and the effect of insecticides on the taste and aroma of tobacco, under the leadership of D. J. Caffrey, USDA, as well as to papers presented by J. P. Vincent, of the American Tobacco Company, on "Insecticidal residues on cigarette and cigar tobaccos and their effects on smoking quality," and by G. A. Brandes, of the Rohm and Haas Company, on "The toxicity of TDE (DDD) to warm-blooded animals."

A part of Wednesday afternoon was devoted to selected tours arranged by the Clemson committee to points of interest on and surrounding the campus and to various experimental plots and demonstrations of the Agronomy, Dairy, Animal Husbandry and Agricultural Engineering departments as well as to the

(Turn to page 96)

Light populations of agricultural insects found in U. S. at this season. Only local infestations in south of importance. Recent tobacco insect Conference held in S. Carolina.

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Washington Report

IN general, the supply of agricultural chemicals seems to be in a much healthier position for the 1951-52 season than it was for last season. Pesticides generally are expected to be in fairly ample supply with the exception of sulfur, lead arsenate and some of the organic materials used for grain fumigants. (See guest editorial by A. W. Mohr, page 30, this issue)

As far as fertilizer materials, the outlook is somewhat as follows:

Nitrogen: The supply for the coming season is expected to be about 1,350,000 tons. Increases in industrial demands or increase in military requirements could alter this prospect. However, a total of almost 600,000 tons of nitrogen is expected from several new ammonia plants scheduled to be under construction during 1952. The full effect of added nitrogen production is not expected to be felt until the 1954 or 1955 crop.

Phosphates: Some curtailment in the supply of superphosphates is expected because of the scarcity of sulfur and sulfuric acid. The 1951-52 supply is estimated at about 2,050,-000 tons or about 8% less than was available in 1950-51.

Potash: A record total of 1,445,000 tons of potash was available for use in the 1950-51 season. New expansion is under way in the field and a conservative estimate of an increase of about 5% in the availability of potash seems warranted.

Production of farm machinery was at a high level in the first half of 1951, but production in the last half of 1951 will be reduced somewhat. However, for 1951 as a whole, the total output of farm machinery will be at about the level of 1949. Beginning with June 1951, materials for farm machinery manufacturers have been allocated. It is expected that this will continue in 1952.

It is expected that about 25% more DDT and about 50% more BHC will be produced in 1951 over 1950. It now appears that 1952 DDT production will be about 10% greater and as much as 20% greater in BHC.

Sulfur continues to be in short supply and will affect many pesticidal uses for the coming year. However, synthetic miticides are being produced to replace sulfur for pesticidal use and this is expected to help to conserve this short commodity.

The Department of Agriculture, together with members of industry, are urging farmers once again to place orders for pesticides early and to be prepared to accept substitute and alternate materials when necessary.

The Crop Reporting Board of the Department of Agriculture indicated in a November 1st report that the cotton crop for this year would be 15,771,000 bales, representing a reduction of 1.16 million bales from its estimate as of October 1st, and a reduction of 1.52 million bales from its estimate as of September. The decline in the crop prospect was attributed by the Board to the effects of droughts in August and September and to the fact that insect damage had been heavier than expected.

This sharp decline in anticipated availability has caused some concern among officials in Washington who are dealing with the problem of cotton availability. It is now quite possible that another determined drive will be made to increase cotton production for next year and there is also a possibility of re-imposition of quantitative export controls on cotton.

This may have an effect on the outlook for cotton insecticides for the 1951-52 season. It is of further interest that the average yield per acre now is estimated by the Crop Board at 285.2 lbs. even lower than last year's 269.2 lbs. and comparing with the September I, 1951 estimate of 290.8 lbs. The indicated supply of cotton for the current season now is placed at around 18.2 million bales with comsumption and export requirements estimated 16 to 16.5 million bales.

A recent meeting of the Lead Consumers Industry Advisory Committee of NPA suggested measures needed to solve problems created by the acute lead shortage. It was pointed out that factors reducing the availability of lead for domestic consumption are loss of imports due to current price limitations which place domestic consumers at a disadvantage in competing for lead on the world

market, a rising rate of consumption, labor shortages in certain mining areas and a declining production at the mine because of higher production costs.

As a partial solution to the problem, it was revealed that arrangements were made with the Canadian government under which the ceiling prices for imported lead were advanced from 17¢ to 19¢ lb. It was shown, however, that this permission for an increase in the price of Canadian material has not brought in any additional quantities but in fact, has resulted in further reduction in imports from other sources. Another request was made by the committee that there be withdrawn from the stockpile of lead a sufficient tonnage to make up for the loss of imports and for past work stoppages and to permit the industry to operate at an economic rate. This shortage of lead will make it extremely difficult to produce the quantity of lead arsenate needed for the coming season and it is expected that the lead arsenate shortage will be serious.

At the writing of this article, the only action that NPA has taken with regard to sulfur was to limit inventories to a 25 day supply at currently scheduled rates of operation. This new order was announced mid-November by NPA as amendment 1 to the sulfur order, M-69. The inventory restrictions became effective on November 9th. Under the provisions of the amended order, users of sulfur have two choices: either limit inventories to a 25 day supply, or restrict themselves to a practical working inventory, whichever is less.

NPA pointed out that nationwide inventories of sulfur are for the most part down to about a 40 day supply. By automatically restricting everyone to a 25 day supply, it was pointed out that government directives on providing sulfur to users with less than this amount can be met. It is feared by NPA that a great number of users are currently operating with only five or ten day supplies of sulfur. Thus, the new

(Turn to page 96)

for the latest facts and figures on the preparation of ready-to-use baits and rodenticides You'll want this new booklet! PRENTISS DRUG & CHEMICAL CO., INC. 110 WILLIAM ST., N. Y. . 9 SO, CLINTON ST., CHI. 6 WEST COAST REPRESENTATIVE S. L. ABBOT COMPANY 135 KING ST. SAN FRANCISCO 7. CALIF CANADIAN REPRESENTATIVE DUNN SALES LTD.
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INDUSTRY NEWS

Naco Names Brown

Rue Lane Brown has been named head of the newly-formed insecticide division at the Fort Pierce branch of Naco Fertilizer Company, according to a recent announcement by Kenneth D. Morrison, Naco president. Mr. Brown who has been a member of the Naco staff since 1941, has been assistant manager of the Fort Pierce branch.

The insecticide plant now under construction at Fort Pierce will be placed in operation during the current citrus and vegetable seasons, according to Mr. Morrison.

Rowe Joins Ashcraft-Wilk

W. Mercer Rowe, formerly vice-president of Flag Sulphur & Chemical Co., Tampa, Fla., has joined Ashcraft-Wilkinson Co., Atlanta, Ga., as of November 1. Mr. Rowe's duties will be in connection with the firm's insecticide activities, according to William E. Merritt, manager of Ashcraft-Wilkinson's Industrial Chemical Division.

P. L. Frost Joins Penick

Pinckney L. Frost has been appointed assistant manager of the Insecticide Division of S. B. Penick & Company, New York, it has been announced by Harold Noble, vice-president.

Expansion of interest in the manufacture and sale of insecticides has made necessary an increase in the staff of this division. The company is basic in such insecticides as pyrethrum, allethrin, ryania, red squill and synergists including isome and sulfoxide. Penick is also a prime source of warfarin, which it markets under its trade name "Dethmor."

Mr. Frost was manager of sales of Innis Speiden & Co., New York, for the past ten years. Earlier positions with that company included outside sales, Cleveland branch manager and assistant manager of sales. He is a member of the Chemists'

Club; Salesmen's Association of the American Chemical Industry; Armed Forces Chemical Association; Tech-



P. L. FROST

nical Association of the Pulp & Paper Industry, American Chemical Society and Rock Spring Country Club.

Born in Buffalo, New York, Mr. Frost attended Milton Academy and Roxbury Latin School near Boston, Mass., and Pratt Institute, Brooklyn, New York. He makes his home in West Orange, New Jersey.

CSMA to Washington

The 38th annual meeting of the Chemical Specialties Manufacturers Association was to be held at the Mayflower Hotel, Washington, D. C., December 2-4. A number of symposia were planned for

Note This New Address

AGRICULTURAL CHEMICALS is moving to its new editorial and business offices at 175 Fifth Ave., New York 10, N. Y. on January 1. Please change your files accordingly.

Advertising plates will continue to be sent to our publication office, 123 Market Place, Baltimore 2, the meeting, including one on aerosols, another on defense emergency programs, and still another on insecticides.

The aerosol division was to include talks and papers by H. E. Petersen, Continental Filling Corp., Danville, Ill., president of the division; and Dr. L. S. Henderson, U.S.D.A., as well as representatives of other manufacturing firms.

Discussing insecticides, were to be representatives of the U.S.D.A., and manufacturers. Speakers were to include division chairman T. Carter Parkinson, McCormick & Co., Baltimore, Md.; T. F. Brennan, American Can Co., New York; Earl D. Anderson, secretary, National Sprayer & Duster Assn., Chicago; Dr. E. L. Griffin, U.S.D.A., Washington, D. C.; and E. J. Campau, Standard Oil Co., Whiting, Ind.

Melvin Goldberg, Pesticide Advisory Service, New York, was to be chairman of the symposium on Defense Emergency Program, on which were to appear the following speakers: P. H. Groggins, chief, Agricultural Chemicals Section, NPA. Washington,; R. J. Small, chief, Metal Cans Branch, NIA Washington; John Lowe, chemicals division, OIT, U. S. Dept. of Commerce; H. B. Esselen, chief, Glass Container & Closures Branch, NPA, T. A. Foster, U. S. Public Health Service, Washington; Howard Grady, OPS, Washington; James A. Carey, chief, Soap & Glycerine Section, OPS, Washington; and L. A. Schlueter, chief, Aromatic Chemicals Div., NPA.

Holmes Upped by Stauffer

Stauffer Chemical Company has announced the appointment of Ernest G. Holmes as sales manager, Agricultural Chemicals, Houston Sales District. Mr. Holmes was formerly manager of the Weslaco, Texas branch.

Edgar Joins NPA Setup

W. Coleman Edgar, naval stores technical representative for Hercules Powder Company, and recently of the company's Dallas, Tex. office, has taken a leave of absence to serve with the Agricultural Chemicals Section of the National Planning Authority in Washington, D. C.

Mr. Edgar a Princeton graduate, joined Hercules in 1943 as a chemist at the Experiment Station, the company's central research laboratories, outside Wilmington, Del.

Del. Fertilizer Meet

A conference of fertilizer dealers and manufacturers was held at the University of Delaware, Newark, November 15. Speakers at the conference were members of the school's Agricultural Experiment Station staff, according to C. E. Phillips, chairman of the agronomy department. Topics included results of fruit and vegetable experiments, the present status of nutrient sprays for vegetable crops, green manures and fertilizers, pasture and corn fertilization and fertilizer grades for 1952.

Riedeburg to New Office

Theodore Riedeburg Associates have announced their removal to new offices in Suite 808, 415 Lexington Ave., New York. The new telephone number is MUrray Hill 7-1488. The firm's offices were formerly in the Chrysler Building in New York.

Pitts. Names Lewton

Pittsburgh Agricultural Chemical Co., New York, has announced the appointment of Theodore G. Lewton, Jr., as the company's west coast sales representative, with head-quarters at the company's San Francisco office at 155 Montgomery Avenue.

From 1938 to 1941, Mr. Lewton was extension Editor of the University of Hawaii Agricultural Extension Service. In 1945, after serving four years with the U. S. Navy, he joined the Pacific Chemical & Fertilizer Co., Honolulu, serving as administrative assistant to the general manager for two and one-half years. In 1948, he was appointed chemical sales representative with headquarters in Hilo, Hawaii. In that capacity he sold agricultural chemicals to sugar planters, cattle ranchers and smaller growers.

Judefind, Davison, Dies

Dr. William Lee Judefind, 55, assistant to the vice-president of operations. The Davison Chemical Corporation, died suddenly of a heart attack in his Baltimore office Nov. 14.

Dr. Judefind was graduated from Western Maryland College in 1915 and after service in the Chemical Warfare branch of the Army, 1917-18, he took his Ph. D. in chemistry from The Johns Hopkins University in 1920. He came to Davison in the same year as a research chemist.

Crain Rejoins Bagpak

R. I. LaMarche, sales-manager for the Bagpak Division, International Paper Company, has announced that C. H. Crain has rejoined the company after a year of active duty with the United States Marine Corps.

Mr. Crain has been assigned as a salesman with the Bagpak Division's Baltimore office. His territory will cover Maryland and Virginia and parts of Delaware, West Virginia and North Carolina. Prior to his service with the Marine Corps, Mr. Crain spent two years with the company as a salesman in the Atlanta, Georgia office.

N. W. Fertilizer Meeting

The second annual meeting of the Pacific Northwest Plant Food Association was held October 25, at McCall, Idaho. Henning Waltersdorph, Seattle, Washington, was named president to succeed G. A. Fitzpatrick, Portland, Oregon. Mac Taylor, also of Seattle, was elected vice-president of the group.

The Association has eighteen active members and approximately the same number of associate members representing the three western states of Washington, Idaho and Oregon. It carries on an educational program which involves passing on information from the experiment station and related research, through fertilizer salesmen and field men to the fertilizer dealer and ultimately to the farmer.

Jack Wursten, Pocatello, Idaho, was chairman of the recent program which included technical papers on soil fertility and field trips to phosphorus deposits, and the Aberdeen Experiment Station.

Long-Time Fert. Man Dies

Walter W. Byrd, 67, for the past 50 years associated with the Furman Fertilizer Co., East Point, Ga., died at his home in East Point in November.

MEETINGS

Northeastern States Weed Control Conference, New Yorker Hotel, New York City, Jan. 2, 3 & 4. Sixth Annual Nebraska State Weed

Sixth Annual Nebraska State Weed Conference & Chemical Show. Lincoln. Nebr.. January 3 & 4 Western Colorado Horticultural so-

ciety, Mesa College, Grand Junction, Colo., January 4 & 5.

Sixth Annual U. of Wisconsin In-

Sixth Annual U. of Wisconsin Insect Control Conference with Industry. Loraine Hotel. Madison, Wis., January 9 & 10.

11th Annual Meeting, Northwest Vegetable Insect Conference. Imperial Hotel, Portland, Oregon, January 21-23, 1952.

Fourth Illinois Custom Spray Operators' Training School, Univ. of Ill., Urbena, January 24 & 25. Association of Southern Agricul-

Association of Southern Agricultural Workers, Atlanta Biltmore Hotel, Atlanta, Ga., February 4-6, 1952.

Western Weed Control Conference, Mapes Hotel, Reno, Nevada, February 5-7, 1952
Southern Weed Control Conference (Following Southern Agri.

Southern Weed Control Conference (Following Southern Agri. Workers meeting). Biltmore Hotel. Atlanta. Ga.. February 6-8

National Agricultural Chemicals Association, Sp.ing Meeting, San Francisco, Calif., 2nd week of April, 1952.

National Fertilizer Association, Greenbrier Hotel, White Sulphur Springs, W. Va., June 16-18,

American Plant Food Council. Homestead Hotel. Hot Springs. Va., June 19-22.

Soil Improvement Committee, Pacific Northwest Plant Food Association, Pocatello, Idaho, July 9, 10 & 11.

Malcolm Joins Powell Co.

Douglas Malcolm, Jr., has joined the sales department of John Powell & Co., New York, the com-



DOUGLAS MALCOLM, JR.

pany has announced. Mr. Malcolm is well known in the agricultural chemical field, having formerly represented R. T. Vanderbilt Co.; Geigy Co., Inc.; and Alrose Chemical Co. He will make his headquarters in the company's New York offices at the present, it was announced.

Pulpwood Insect Control

Further research into the problem of insect infestation of pulpwood has been made possible through a \$7,800 grant by Napco Foundation, Port Edwards, Wis. to the University of Wisconsin. This recent grant brings the total to \$14,100 the Foundation has assigned for this project.

The project was established in 1948 to study insect damage control in stored pulpwood and prevention of damage to adjacent timber. At that time a grant of \$6,300 was turned over to the University by the Foundation, covering the research for a three-year period.

Canadian Plant Opened

Canada Packers opened its new fertilizer plant in Chatham, Ontario, recently, with an open house ceremony which attracted farmers from a wide area of Ontario. Speakers at the open house included the mayor of Chatham, W. R. Carroll, general superintendent for the company; J. D. Browne, manager of the Chatham plant, T. J. Payne, Toronto, manager of fertilizer and feed division, and A. Mooney, sales manager of the division.

Millmaster Co. Moves

Millmaster Chemical Company was to move the executive offices from 420 Lexington Ave. to 11 West 42nd St., New York 36, N. Y., November 15, 1951, it has been announced by R. J. Milano, president. Telephone number of the new New York office is Longacre 4-1346. Millmaster serves as selling agent for a number of domestic manufacturers, including Sloss-Sheffield, Steel & Iron Company, Birmingham, Alabama; Nassau Chemical, Inc., San Francisco, California; Berkeley Chemical Corporation, Berkeley Heights, New Jersey; Arapahoe Chemicals, Inc., Boulder, Colorado; and Barium & Chemicals, Inc., Willoughby, Ohio.

Berkshire Chemicals, Inc., 420
Lexington Avenue, New York, will supersede Millmaster as selling agent for F. W. Berk & Company, Inc., Wood Ridge, New Jersey, on such products as mercurials, zirconium compounds, boron, fertilizer materials, fungicides, etc. Millmaster will continue to represent Berk in the sale of cuprous chloride, potash, chrome alum, calcium acetate, and potassium acetate. Otherwise, the nature of Millmaster's activities will remain substantially the same as in the past.

Other officers of Millmaster are Jerome F. McGinty, vice president; Charles L. Westenberg, treasurer, and Charles R. Brinkerhoff, secretary.

Schor, Velsicol S.M.

The Velsicol Corporation announces the appointment of Andrew Schor as sales manager of the resin and solvents division. Prior to this appointment, Mr. Schor was head of the technical service division. He has been with the Velsicol Corporation six years and began his employment as a development chemist. Mr. Schor was graduated from the University of Chicago with a master of science degree in chemistry and served in World War II in the Air Force.

Wisconsin Meeting in Jan.

January 9 & 10 are the dates set for the University of Wisconsin's sixth annual insect control conference with industry. The meeting, sponsored by the Entomology Department of the University's College of Agriculture, will be held at the Loraine Hotel in Madison, according to E. H. Fisher, associate professor in the department of entomology.

Davison Names Board Members and Execs.



J. P. GRACE, JR. R. L. HOCKLEY

Davison Chemical Corp., Baltimore, has announced additions to its board of directors and a new executive vice-president of the company. J. Theodore Wolfe, executive vice-president, Consolidated Gas Electric Light & Power Co., Baltimore and J. Peter Grace, Jr., president,



J. T. WOLFE M. G. GEIGER

W. R. Grace & Co., New York, were elected directors; M. G. Geiger, formerly Davison's executive vice-president, is now vice-chairman of the board, and R. L. Hockley, formerly vice-president for marketing, was named vice-president of the company.

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handle easily. Phillips 66 Prilled Ammonium Nitrate can be depended
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New Shell Office in Ga.

Shell Chemical Corp. has opened a new sales office in Atlanta, Ga. to serve the southern area, according to L. V. Steck, the corpora-



M. W. ELLISON

tion's marketing vice-president. In charge of the new sales district is M. W. Ellison, formerly of the New York sales staff.

Mr. Ellison, a native of Montgomery, Ala., has been with Shell since 1946. He is a graduate of Alabama U. and served in the U.S. Navy during World War II. His territory, aided by a staff of technically-trained salesmen, will include the states of Virginia, North and South Carolina, Georgia, Florida, Alabama and Tennessee.

Leonard Operated On

George F. (Grub) Leonard, Tobacco By-Products & Chemical Corp., Richmond, Va., recently underwent two operations for hernia. He is reported recuperating nicely, and will probably spend some time in Florida in the course of completing his recovery.

Berkshire Chem. Formed

Effective November 15, 1951, the name of Millmaster Chemical Corp. was to be changed to Berkshire Chemicals, Inc. The offices of the company will remain at their present location in the Graybar Building, 420 Lexington Avenue, New York 17, N. Y., telephone number Lexington 2-5959. Berkshire Chemicals, Inc. will continue to act as exclusive sales agents for F. W. Berk & Co., Inc. for the sales of agricultural magnesia and other fertilizer materials, as well as insecticides, fungicides and industrial chemicals.

Officers of the company are:
M. H. McAllister, executive vicepresident; W. L. Gay, vice-president;
Arthur Smith, vice-president,
secretary-treasurer; J. T. Malloy, asst.
treasurer, and J. G. Langille, asst.
secretary. Directors are: M. H. McAllister, W. L. Gay, Arthur Smith,
H. A. Withey and Ruth Romer.

Radioactive Report Dec. 19

A review of the Radiophosphorus Research Program which has been supported in part by the fertilizer industry, will be held December 19 at the U.S.D.A. Plant Industry Station, Beltsville, Md. Speakers appearing on the advance program included Dr. F. W. Parker, I. A. Dean, J. M. Blume and S. B. Hendricks. Regional reports were to be given covering the Western, north central, southern and northeastern portions of the U. S.

The meeting will be held in the Station auditorium beginning at 10 a.m. Lunch will be in the Plant Industry Station cafeteria.

2-Company Stock Offered

Managements of the Pennsylvania Salt Manufacturing Co. and Sharples Chemicals Inc. have announced an agreement whereby Pennsalt common stock will be offered in exchange for Sharples common stock at the rate of 5.15 shares of Pennsalt for one share of Sharples. It is expected that the offer will be made the latter part of December.

In announcing the exchange plan, officers of the two companies pointed out that combining the two businesses will further diversify both. Pennsalt has been engaged principally in the manufacture of inorganic chemicals but in recent years has been extending its activities into the organic field. Sharples Chemicals has specialized in synthetic organics, not now marketed by Pennsalt.

New Feldspar President

Winifred L. Haag has been named president of United Feldspar & Minerals Corporation, New York, it has been announced by the com-



WINIFRED L. HAAG

pany. The new chief executive, widow of Major Francis E. Haag founder of the mining corporation, is the first woman company president in the feldspar field.

Mrs. Haag has been associated with the corporation for several years as executive vice-president and chairman of the board of directors. In addition, she wil! assume the presidency of three of United Feldspar's affiliates; Carolina Pyrophyllite Company, Glendon Pyrophyllite Company and Major Pyrophyllite Company, all located in North Carolina.

Principal ores recovered by United in its North Carolina and Maine mines are pyrophyllite and feldspar. These hydrous and potash alumina-silicates are used widely in the insecticide field.

Colo. Hort Meet in Jan.

Don Marcue, secretary-treasurer, Western Colorado Horticultural Society, Grand Junction, Colo., has announced that the 9th annual meeting of the group will be held in the Mesa College Auditorium Friday and Saturday, January 4 and 5, 1952. The program was not complete at press time, but Mr. Marcue stated that speakers from various parts of the country were expected to appear.



Latest addition to the TRITON line is specially made to solve emulsification and storage problems presented by DDT-solvent concentrates.

TRITON X-177 at concentrations of 2 to 4% economically and effectively emulsifies DDT spray concentrates. DDT spray concentrates with TRITON X-177 pass all field performance tests as well as rigid Army and Navy specifications.

TRITON X-177 is also useful in the emulsification of RHOTHANE, methoxychlor and herbicides based on 2.4-D and 2,4,5-T compounds.

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New Phosphorus Plant for Victor Chemical



Victor Chemical Works, Chicago, has announced production of the first elemental phosphorus ever produced in the state of Montana, at its new electric furnace plant at Silver Bow, Mont. The pioneer tank car of phosphorus was dispatched to the Victor plant at Chicago Heights, Ill. on November 5. Governor John W. Bonner, Montana, and Rothe Weigel, Chicago, Victor president were on hand for the starting operations. Victor also operates electric furnaces at Mt. Pleasant, Tennessee and Tarpon Springs, Florida, in addition to the new one.

Paper Bag Committee Meets

Effect on their industry of Ceiling Price Regulation 88, covering unbleached kraft paper, was discussed recently with OPS officials by members of a subcommittee of the Paper Shipping Sack Industry Advisory Committee, preparatory to the drafting by OPS of a tailored regulation for the industry.

Committeemen reported that ceilings on 40 pound kraft paper, determined under CPR 88 by applying specified differentials to ceilings spelled out for 50 pound paper, would tend to increase their material costs, and would squeeze them if an attempt is made to maintain prices for paper shipping sacks established under G.C.P.R.

Kraft paper manufacturers asserted that the differentials allowed for 40 pound paper and other lighter weights were not adequate to cover the difference in cost between these weights and 50 pound paper.

The paper shipping sack subcommittee also discussed the definition of paper shipping sacks in contrast with paper bags. It was brought out that in the industry consumer flour and sugar packets are commonly bracketed with shipping sacks, while coffee sacks are bracketed with paper bags.

The subcommittee pointed out that the industry normally sells at closely competitive prices and said that the proposed tailored regulation should be drawn so as not to result in divergent prices. Committeemen urged that OPS take into consideration any increase in their costs for lightweigh, paper that might be experienced under CPR 88.

The meeting was conducted by M. C. Walsh, chief, Pulp, Paper and Paperboard Branch, and Bernard W. Recknagel, consultant for coarse papers, OPS.

Other OPS officials present

We are Moving Jan 1st!

After the first of the year, editorial and business offices of AGRICULTURAL CHEMICALS will be at 175 Fifth Ave., New York 10, N. Y.

All advertising plates should continue to be sent to our publication office, 123 Market Place, Baltimore 2, Md. were: Rufus I. Worrell, director, Pulp, Paper and Paperboard division; Edward U. Dennison, economist, and Harrison J. Daysch, counsel.

Members of the subcommittee present were: A. A. Scholl, International Paper Co., Bagpak Division, New York; Charles S. Sheldon, Chase Bag Co., New York; and Gilbert A. Weisberger, Equitable Paper Bag Company, Inc., Long Island City, N. Y. W. J. Dixon, St. Regis Paper Co., New York, member of the main committee, also attended.

Kolker Makes New Product

Diamond Alkali Company, Cleveland, O., announced on Nov. 23 that its Kolker subsidiary, specializing in the manufacture of agricultural chemicals, has started commercial production of technical trichlorobenzene, at Kolker's Houston, Tex., plant.

This new product, among other specifications, has a boiling range of 210-deg. to 230-deg. centigrade, a specific gravity of 1.463, a freezing point of 8-deg. centigrade, and a pH⁶. The material is now available in both drum and tank car quantities.

Trichlorobenzene is used extensively in the insecticide field, particularly for termite control. Another important application of the material includes its use as a solvent.

Iowa Fertilizer Meeting

The fifth annual Fertilizer Manufacturers' Conference will be held in Ames, Iowa, January 18, according to H. B. Cheney, extension agronomist, Iowa State College. The entire program had not been completed at press time, but a presentation of experimental results of recent tests was expected to be made by workers.

It has also been announced that the Fertilizer Dealers' Short Course, normally held at Ames, will not be held this year. Instead, five district fertilizer meetings were planned to be held in Ottumwa, Red Oak, Storm Lake, Waterloo and Ames during the first week of December.







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Agri. Pesticide Conference at Yakima



C. W. Van Rosenberg, Civil Aeronautics Authority. Ft. Worth, Texas, addressing the luncheon meeting, report-

ing results of 25.000 mile tour of new agricultural airplane.

M ORE than 150 aircraft applicators and representatives of the agricultural pesticide industry met at Yakima, Wash., November 8 and 9 for the Third Annual Dusting and Spraying Conference at the Chinook Hotel. The conference was jointly sponsored by the Washington State Aeronautics Commission, the Institute of Agricultural Sciences of the State College of Washington, and the Washington State Department of Agriculture.

V. C. Young, Agricultural Engineer, B.P.I.S.A.E., Forest Grove, Oregon, reported on studies of aerial application of insecticides. By selection of number of nozzles, type and spacing, most efficient distribution of spray cab be accomplished, he said. C. W. Getzendaner, entomologist of the BEPQ, presented kodachrome movies showing the characteristics of spray patterns. Some 47,000 acres of peas were treated in the Pacific northwest, with parathion used against the pea aphid on peas.

John S. Riss, of the special equipment and aircraft center, Oklahoma City, outlined the program of this unit to assist in development of aircraft specifications, the inspection of aircraft and aid in improving standards of flight personnel.

E. W. Anthon, assistant entomologist, Tree Fruit Experiment Station, Wenatchee, told of the place of aircraft for orchard spraying and stressed the limitations and factors involved for their successful use. Paul Eide, assistant entomologist, North western Washington Experiment Station, Mount Vernon, gave the reasons for some aircraft failures in aphid control in the west coast areas. Poor timing and evening flying were chiefly responsible for these failures.

The guest speaker at the noon luncheon, C. W. Von Rosenberg, C. A. A., Fort Worth, Texas, traced the development of the Ag-1 aircraft. Simplicity of structure and optimum safety features were the aims of the designers. The plane has recently returned to its home base after a 25,000 mile tour of the country. To date, 650 different pilots flew the plane and submitted their comments. The present task of the Fort Worth engineers is to perfect the dispensing equipment for sprays and dusts.

One of the largest operations involving application of insecticides by aircraft in the Pacific Northwest has been the cooperative control program for the spruce budworm. Mr.

by Dr. Hal G. Simkover

Washington State College

R. L. Furniss of the BEPQ portrayed the building up of this pest during the last 8 years and showed that one pound of DDT applied by air has effectively checked the budworm's ravages. Over 2,130,000 acres have been treated to date.

Dr. Roderick Sprague, plant pathologist, Tree Fruit Experiment Station, discussed airplane control of plant disease. The future of aircraft application of fungicides and an illustrated talk on the ABC's of plant pathology were presented by Dr. Charles Wright, assistant professor of Plant Pathology, W. S. C.

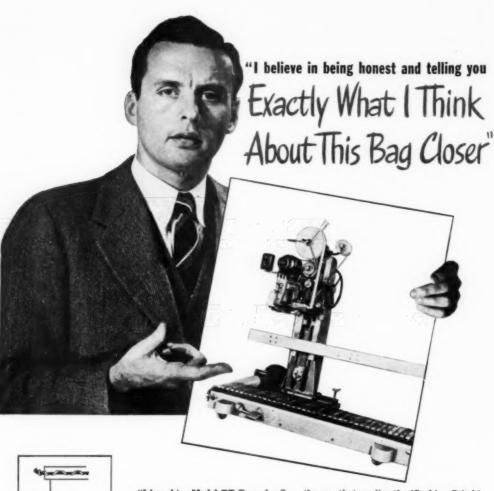
Research on the effects of insecticides on human health was reported on by J. Leon Sealey, M. D., of the Medical School at the University of Washington, and by J. Monte Johnston, M. D., and Gordon Batchelor, entomologist, representing the Public Health Service Laboratory in Wenatchee. Lack of recommended precautions and carelessness of handling were the reasons given for the hospitalization of three operators in misusing parathion. Researchers in the Wenatchee laboratory are carrying out long-range experiments, particularly with DDT, attempting to show differences in potential hazard in various occupations from insecticide formulators and casual exposure to the public.

The Civil Aeronautics Commission, represented by D. R. Nelson and E. D. Jacobson, pointed out how flight safety records could be improved. Accidents cost the air spray application industry three million dollars in 1950.

B. J. Landis and Kenneth Gibson, entomologists of the BEPQ, outlined experiments in airplane application of insecticides to control the potato aphid. Use of a 5% DDT, ½% parathion and 50% sulfur dust mixture proved to give the best results.

Dr. E. P. Breakey, associate entomologist, Western Washington Experiment Station at Puyallup, traced the development of new insecticides.

The conference went into (Turn to Page 93)



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Notes on Safety in Insecticide Use

HE Department of Entomology of Cornell University, in making extension recommendations on insecticide use during the coming season, announced at a recent conference in Ithaca, N. Y., that it is withholding recommendations for the use of chlordane on food crops for 1952. Recently, representatives of the Federal Food and Drug Administration advised the Department that the FDA has found 1 part per million of chlordane in carrots grown in western New York State where the insecticide was applied for carrot rust fly control. A bio-assay was used to make the residue determination. Until further clarification, the same policy applies also to the use of aldrin, dieldrin and heptachlor. . . .

While no legal tolerances have been set as yet by the Federal Food and Drug Administration on permissible residues of these or other insecticides, it is possible that permitted limits will be announced before the opening of the 1952 season on the basis of the data submitted in the 1950 FDA hearings.

Pending the announcement of specific limits by the FDA, however, their present position is understood to be that 5 parts per million of DDT represents the upper safe limit of contamination of any single item of the diet; and that if several items of the diet contain DDT, no one item should contain over one part per million. This restriction has been interpreted to mean that no edible portion of a vegetable crop should contain in excess of 5 parts per million of residue at harvest. It is understood that the canning and processing industry objects to the presence of any DDT on vegetables or fruits at the time of processing unless such residue can be completely removed by washing or otherwise.

To be on the safe side, users are cautioned that no DDT or other chlorinated hydrocarbon be used within fifteen days of harvest. On crops like cauliflower, sprouts and broccoli, its use should be avoided

within thirty days of harvest. It could probably be used safely, although not within fifteen days of harvest, on crops like corn, cabbage, lettuce and bulb onions, the outer parts of which are discarded. However, recently treated parts should not be fed to cattle.

The suggested tolerance limit on parathion is two parts per million. To be below this tolerance, it can probably not be used safely on edible portions of a vegetable within twelve to fifteen days of harvest.

For continuing control during the periods when the more toxic insecticides cannot safely be applied, the grower or custom sprayer must use non-residuals such as rotenone, pyrethrum, piperonyl butoxide, fixed nicotine or TEPP.

Most insecticides are poisonous to man, and must be stored, handled and used with care and adequate safety measures. The organic phosphate materials particularly, which include parathion, EPN and TEPP, are extremely hazardous if improperly used. The following precautions have been listed as essential:

- The greatest danger from parathion and EPN wettable powders appears to be in the operation of putting the wettable powder from the bag or can into the spray tank. Be careful at this point.
- Wear a respirator. One having a filter for powder and an activated charcoal filter for organic vapors.
- 3. Wear natural rubber gloves.
- Protect the body from wettable powder and from spray drift. Wear rubber or plastic coats or wash clothes frequently.
- Symptoms of poisoning: Headaches, nausea, pin-point vision, constriction of the chest.
- If the above symptoms are experienced, do not delay—see your doctor. The antidote is atropine sulphate and cannot be obtained without a doctor's prescription.
- 7. Handling insecticides safely is similar to driving an automobile or, handling fire. If certain precautions are followed these useful instruments and materials can be used to our advantage. If misused they can do us serious harm.

III. Spray School Planned

Illinois Custom Spray Operators' Training School will be held for two days, January 24 & 25, at Illini Union, Urbana, according to an announcement made by H. B. Petty, extension specialist in entermology, University of Illinois. Present plans for the program include talks by a number of out-of-state specialists to discuss weed control, brush control and spittle bug control, in addition to speakers from the Illinois U. College of Agriculture.

Mr. Petty declared that the school is for not only commercial applicators, but also for dealers, salesmen, manufacturers' representatives, farmers and other persons interested in agricultural pest control.

New Hooker Plant Planned

Hooker Electrochemical Company, Niagara Falls, plans to build a new \$10,000,000 plant for the manufacture of chlorine and caustic soda at Montague, Michigan, it has been announced by R. L. Murray, Hooker president. The new plant is expected to be in operation by the end of 1953, with a yearly production rate of approximately 100,000 tons of all products. Output of this plant is intended to serve midwest industry.

Design of the plant will be in charge of the company's own engineering department, and every effort will be expended to make the Montague plant one of the outstanding chemical plants in the country. Total plant area, including a brine field comprises over 400 acres.

Ky. Pasture Tour Planned

The second annual Green Pastures tour sponsored by the Kentucky Agricultural Experiment Station, Lexington, is to be held April 22-24, 1952, in southern Kentucky. According to Wm. C. Johnstone, field agent in agronomy, the tour will include stops at Cumberland Falls and the new Wolf Creek dam. En route, the group will visit several of the outstanding pasture farms in that section.



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Delaney Committee Completes Coast Hearing

THE west coast hearings of the Delaney Committee, 7-man select Congressional group charged with tesponsibility in determining the effect of chemicals in and on foods, brought out both pros and cons regarding chemical uses.

On the positive side appeared C. E. Chase, who described himself as an owner and operator of apple orchards for 40 years and "a layman who has had a great deal of practical experience in the use of insecticides during a period of over 35 years." He declared that "there is a distinct difference between chemical additives to food and insecticides required in the production of fruits and vegetables," emphasizing that "they should be considered entirely separate."

Mr. Chase said that producers are well aware of their responsibility to deliver products safe for public consumption. He told the committee that producers act as their own guinea pigs" as was clearly shown in the three year study made by the U. S. Public Health Service in 1940. "During the course of that study they found apple growers and others in the producing areas consuming apples with more than twenty times the amount of amenate of lead spray residue, permitted in interstate shipment. Many of the growers and inhabitants had been doing this for over 30 years! All of this was without perceptible ill-effect on their heatlh." These facts are also known more in detail by several of the committee members, he reminded.

The U. S. Public Health Service has established a toxicological laboratory in Wenatchee (Washington), Mr. Chase reported, and he then recommended that in the future, "all tolerances set under the procedure authorized in the Food and Drug Act, including administrative and tentative tolerances, be based entirely on the recommendations of the U. S. Public Health Service, as was done in establishing the administrative tolerances on arsenic and lead.

In addition to their own research, the U. S. Public Health Service, in arriving at tolerances safe to public health, would be the competent authority reviewing the results gained from research, work and studies made by other laboratories, colleges and agencies, and also from whatever authentic information they receive from manufacturers. U. S. Public Health Service findings and conclusions are accepted throughout the scientific world, he pointed out.

"We believe that the Food and Drug Administration should be an enforcement agency only in enforcing rules and regulations pertaining to insecticide tolerances and their application to fruits and vegetables. The problems of enforcement inevitably subject them to considerations that, in our opinion, should not be permitted to infringe upon research in any way. This, of course, would particularly apply to this agency not making determinations of their own in connection with the toxicity of insecticide residues which result from spraying and other uses in the production of fruits and vegetables.

"Another important factor of this question is the determination of necessity for use of insecticides. We believe this should be done by the U. S. Department of Agriculture, as is now authorized by the Federal Insecticide, Fungicide and Rodenticide Act of 1947. The U.S. Department of Agriculture is an agency vitally concerned with production and consumption. They are vitally concerned with the health of consumers. From the testimony of Dr. Frank C. Bishopp and Dr. E. L. Griffin of the Department of Agriculture, together with that of Dr. George C. Decker of the Illinois Agricultural Experiment Station, and others, before the committee, it appears that but little additional legislation is required to protect the public under this act. If, in the judgment of this committee, further legislation becomes necessary, it should be accomplished by an amendment to the Act of 1947.

"From the testimony of these witnesses, it appears that the Department of Agriculture, in determining the label requirements for insecticides, and whether they shall be released for use, obtain all available known information and evidence in connection with the insecticide they are considering. They call on the Food and Drug Administration, the U. S. Public Health Service, manufacturers, research organizations, both private and public, as well as colleges and experiment stations which may have knowledge of the particular insecticide being considered. From this evidence, after evaluating it, they make their decision as to the label requirements as well as whether or not they will approve its use. It would seem that this would be the safest and fairest method in making these determinations, and much better than setting up a very large and fully staffed toxicological laboratory under the Food and Drug Administration to do this work.

"In many instances, the testimony before your committee indicates that the witnesses feel that an impartial agency should make the determination of toxicity," he continued. "In some instances they refer to the Food and Drug Administration as being such an impartial agency. With all due respect to the Food and Drug Administration, we have found them to have been loath to change their minds when they have set an informal or tentative tolerance. And, characteristic, we think, of most enforcement officials, they do not like to admit mistakes. As mentioned before, this has been very costly to our industry, and thus greatly impaired the welfare of producers.

"We believe that if the committee concludes that further funds in the way of appropriations should be made available to the U. S. Public Health Service, as suggested by the Administrator, it would be very helpful to the entire program if you will so recommend," he said.

"In view of past experience, and after carefully studying much of the committee's evidence," Mr. Chase proposed a program in respect to fruits and vegetables, as follows:

- That the determination of use of Insecticides remain the duty of the U. S. Department of Agriculture, and any further authority the committee feels necessary be supplied by amendments to the present Federal Insecticide, Fungicide and Rodenticide Act of 1947.
- 2. That all determinations of toxicity in connection with the use of insecticides by the fruit and vegetable industry be determined by the U. S. Public Health Service, and all tolerances set under the procedure authorized in the Food and Drug Act, including administrative and tentative tolerances, be based entirely on recommendations of the U. S. Public Health Service.
- That the Food and Drug Administration be designated as the enforcement agency for which we believe they are well organized and qualified; and that their authority be limited to enforcement of the law.

"We are confident that the fruit and vegetable industry would approve such a program and lend their united support toward its enactment and adoption."

Taking a decidedly different stand on the subject, Drs. Bernard Krohn and Francis M. Pottenger, Jr., both of Monrovia, Calif., told the committee the use of DDT as an insecticide on crops is dangerous to human beings. They declared that their opinions were based on scores of autopsies and tests on "hundreds of persons." One doctor testified that "more than half of a group of people living in an agricultural area where DDT is used" showed nervous disorders and liver damage. The ailments were alleged to have resulted from DDT poison-

Following these observations, Dr. Krohn stated that "There should be a Federal law requiring anyone using pesticides in or near food to prove that his method does not make the food poisonous and legislation requiring that all foods sprayed with highly concentrated pesticides should be labeled."

"The Delaney Committee is to complete its hearings in New York City in January, preparatory to making its final report to Congress.

CPR 22 AMENDMENT

With the issuance of Amendment 4 to CPR 22, the Office of Price Stabilization on November 29, relieved fertilizer manufacturers of the double burden of computing ceiling prices under CPR 22 and later (after January 1) under a tailored regulation.

This allows the manufacturer to determine ceiling prices of fertilizers and fertilizer materials, under the General Ceiling Price Regulation, and makes it unnecessary to file Form 8 under CPR 22 or Forms 100, 105 and 106. The manufacturers of the following materials are affected by the new amendment:

Superphosphate and mixed fertilisers
Synthetic sulphate of ammonia
Synthetic nitrate of soda
Ammonium nitrate
Ammonium nitrate-lime compound
Urea compounds
Urea-ammonia liquors
Nitrogen solutions
Anhydrous Ammonia
Synthetic ammoniacal liquors

New Toxaphene Plant for Hercules

H ERCULES Powder Company has announced plans for the construction of another toxaphene manufacturing plant at Henderson, near Las Vegas, Nevada. The company will spend over \$2,500,000 for the added facilities which will increase the present output of toxaphene by approximately 25%.

Construction of the new plant will start immediately, and it is expected that operations will begin early in 1953. The plant will require an operating force of 60 to 70 people.

The company said it is contracting to purchase land on the Basic Magnesium Project, a World War II government-built plant for the manufacture of magnesium. The site is adjacent to the plant of the Stauffer Chemical Corporation, which will supply chlorine required in the manufacture of toxaphene. The availability of chlorine was an important consideration in the location of the plant, the company said. In recent months, not only has chlorine been scarce, but tank cars for the shipment of chlorine have been difficult to obtain.

Most of the \$2,500,000 cost of the new facilities will be spent at Henderson. The remainder will be required at the Hercules plant at Hattiesburg, Mississippi, for the installation of facilities to supply process materials to the new plant.

The Henderson location also will be close to important markets for the insecticide, the company announcement said. The plant will serve chiefly the southwestern and western states as well as export material to Mexico and Central and South America.

Since the introduction of toxaphene commercially in 1947, it has grown to be one of the leading agricultural insecticides. It was first used for control of grasshoppers and cotton insects, and recommendations for its use against other destructive insects followed. Official State and Federal recommendations now list toxaphene for effective control of more than eighty insect pests, including those attacking cotton, forage crops, livestock, peanuts, and other farm products.

Toxaphene has been tested extensively by the United States Department of Agriculture, and by many state experiment stations. At the present, cooperative projects or fellowships are in progress at a number of colleges and institutes in the country to determine its efficiency against other insect groups.

The Henderson plant will be the third toxaphene unit to be built in the United States. Other plants are at Brunswick, Georgia and Hattiesburg, Mississippi.

Sulfur Committee Meets

Members of the Native Sulfur Industry Advisory Committee, meeting Nov. 19 with the NPA, U. S. Department of Commerce, estimated that the industry's production for 1952 would not exceed 5,000,000 long tons.

NPA said that the current annual rate of production, based on the first ten months of 1951, is 5,311,438 long tons.

The meeting was called by NPA to discuss estimates of production in order to assist the agency in determining the extent of the controls which would have to be put into effect to meet current shortages of sulfur and sulfuric acid.

For the past month NPA has been meeting with various industry advisory committees concerned with the use of sulfur and sulfuric acid in order to obtain the best-informed industry opinion before writing any orders further restricting the use of these products. Since June 1951, when NPA issued its basic sulfur order, M-69, sulfur users have been restricted to 100 percent of their 1950 use.

On October 16 the Defense Production Administration announced a suggested sulfur program which would restrict certain uses of sulfur to 90 percent of the 1950 base period, particularly for sulfuric acid used in the phosphatic fertilizer and other industries.

Spokesmen for the native sulfur industry were unanimous in stating that the present annual rate of production could not be taken as a reliable estimate of possible 1952 production, and particularly as an estimate for the first half of 1952. They pointed out that current inventories are considerably below those of 1950 and that the output from a number of mining properties is declining and probably will continue to decline during the first half of 1952.

They further emphasized that some new production which is being developed will not begin to affect the supply situation until the last half of 1952. NPA told the committee that the type of order to be written on sulfur had not yet been decided upon. Control of sulfur distribution, NPA said, could be effected by either limitations on use or by an order making direct allocations to each company's customers. There are four producers of native sulfur and an estimated 230 processors of the product, used largely for the manufacture of sulfuric acid.

A preference was expressed for a direct allocation order modified in order to schedule barge and vessel shipments. A single shipment may carry as much as a six-month supply, thereby presenting difficulties in meeting a monthly or quarterly allocation plan, it was pointed out.

Presiding at the Nov. 19th meeting was O. V. Tracy, director of NPA Chemical Div. The following industry representatives were present: George Hoffman, president, Duval Sulphur & Potash Co., Houston, Tex.; R. K. Shirley, executive vice-president and treasurer, Freeport Sulfur Co., New York; Eugene H. Walet, president, Jefferson Lake Sulfur Co., New Orleans and Fred M. Nelson, president, Texas Gulf Sulfur Co., New York.

Dr. Kwartler to Gamma

Dr. Charles E. Kwartler has been appointed director of Product and Process Development of the Gamma Chemical Corporation according to an announcement made by Gamma's president, J. Robert Fisher from the Corporation's Executive Offices in the Lincoln Building, New York. Dr. Kwartler will make his headquarters at Great Meadows, N. J.

Dr. Kwartler comes to the Gamma Chemical Corporation after a thirteen year association with Winthrop-Stearns Inc., Albany, N. Y., where he was in charge of process development, and Winthrop Products Company, also of Albany, of which he was chief chemist.

Stoddard Named Sls. Mgr.

Dr. Alfred Weed, vice-president in charge of sales for John Pow-

ell & Co., Inc., New York, has announced the appointment of John Stoddard as sales manager in charge of all domestic sales activities.

Dr. Weed also announced the



JOHN STODDARD

promotion of Paul Williams to sales representative for Powell's Southeastern Regional territory. Mr. Williams' headquarters will be in Huntsville, Alabama.

Purcell Joins Penick

J. W. Purcell, formerly vicepresident of Prentiss Drug & Chemical Co., New York, and more recently connected with Pearson & Co., Mobile, Ala., has just joined S. B. Penick & Co., New York. He will work as a salesman in Penick's expanding insecticide division.

MAC to Calif. in April

The regular spring meeting of the National Agricultural Chemicals Association will be held on the west coast the second week of April, 1952, the Association headquarters in Washington, D. C. announced as this issue went to press.

San Francisco will be the location, it was indicated, but the name of the hotel nor the exact dates of the convention had not been confirmed. Lea S. Hitchner, executive secretary and treasurer of the Association, was in California early this month making final arrangements with the NAC president, Arthur W. Mohr, president of California Spray Chemical Corp., Richmond, Calif.

Pesticides by Wyandotte

Plans have just been concluded for Wyandotte Chemicals Corporation's entry into the industrial insecticide market, according to an an-



CHARLES F. GERLACH

nouncement made by Bert Cremers, vice-president of the Michigan Alkali Division. The industrial insecticides sales department will handle the sales of benzene hexachloride and related products.

Wyandotte Chemicals has retained the service of Charles F. Gerlach, formerly vice-president and general sales manager of Michigan Chemical Corporation. Mr. Gerlach is a graduate of the University of Wisconsin with degrees in zoology and entomology, and has served as state and district entomologist for the states of Illinois, Wisconsin, Indiana, Michigan, Ohio, and Kentucky. He is also a member of the board of governors of the U. S. Public Health Service Reserve Officers Association. Industrially, he has served in the capacities of entomologist, technical service director and agricultural and insecticide sales manager.

Activation of the industrial insecticides sales department is effective immediately, with initial insecticide deliveries planned for January, 1952.

Dr. Thomas Named to Board

Dr. Charles A. Thomas, president of Monsanto Chemical Co., St. Louis, has been elected as a corporation trustee of the Carnegie Corporation of New York, it was announced on Nov. 20.

Expands Testing Service

Insecticide Testing Laboratories, Wilmington, Ohio, have announced an expanded service for the testing of household insecticides. The laboratory has two Peet-Grady chambers in operation, according to Frank O. Hazard, head of the laboratory.

Former Station Head Dies

Dr. Ulysses P. Hedrick, 81, director emeritus of the New York Agricultural Experiment Station, Geneva, died on November 14. He joined the experiment station at Geneva in 1905 as chief horticulturist. He was named director of the station in 1928 and retired in 1933 as director emeritus. Dr. Hedrick was a native of Iowa, was graduated in 1893 from Michigan Agricultural College, now Michigan State, and taught in Utah and Oregon before returning to the east.

Bark Beetle Continues

.Widespread killing of pine trees by bark beetles continued in 1951 in the south according to entomologists of the U. S. Department of Agriculture, who estimate that more than 50 million board feet of lumber were ruined during the summer months. The southern pine beetle, as in 1950, caused greatest damage. However, it was aided in its destructive activities by the black turpentine beetle and species of pine engraver beetles.

The southern pine beetle was especially troublesome in portions of east Texas and eastern North Carolina. The black turpentine beetle caused damage in North Carolina, Florida, Mississippi, and Louisiana. Large numbers of trees faced for turpentining in North Carolina and Florida were killed by the turpentine beetle. The pine engraver beetles killed pines throughout the southern states.

LaForge to Bkn. Firm

Byron A. LaForge has just joined the technical and sales staff of Chemical Insecticide Corp., Brooklyn, N. Y. Mr. LaForge for the past



BYRON A. LAFORGE

14 years has been technical adviser and specialist in the agricultural and packaged insecticide fields.

Court Says "No" to Hyman

The U. S. Supreme Court on Nov. 5, denied a petition by Julius Hyman & Co. for review by writ of certiorari of the judgment of the Supreme Court of Colorado affirming a decree of the Denver District Court. This renders final the decree of the District Court as modified by the Supreme Court of Colorado which, in part, enjoins Hyman from making and selling various chemicals including chlordane.

This decree, in addition to its injunctive features, orders the payment by the defendant to Velsicol Corp., the sum of \$1,663,499.40 on account of "damages caused and gains and profits realized by the Hyman Co. from the production and sale of chlordane" up to March 31, 1949. Of this sum, \$1,338,789.10 is payable without further proceeding and \$324,710.30 is payable provided a refund, deduction, or other benefit is derived by Hyman from its income tax liability for the fiscal years 1947.48 and 1948.49.

Geigy Personnel Changes

Geigy Co., New York, has announced a number of personnel changes affecting its activities in various parts of the country.



DR. JOSEPH ANTOGNINI

John G. Plowden, former assistant sales manager, has been appointed Western Division sales manager in charge of operations in California, the Northwest and the Rocky Mountain area. He will be located at Fresno, Calif., the Western Division's headquarters.

Louis G. Gemmell, manager of Technical Service, becomes assistant sales manager succeeding Mr. Plowden and will continue his duties of technical survey and legislative matters. Mr. Gemmell's previous activities include six years with Sherwin-Williams Co., and six years with American Cyanamid Co.

Dr. Jos. Antognini has been appointed agronomist at the Research Laboratory at Bayonne, N. J. and will be chief of research and development work on herbicides, defoliants and related agricultural chemicals. A native Californian, Dr. Antognini received a B.S. degree from the University of California, College of Agriculture at Davis, following which he received a Ph.D. from the graduate school at Cornell University last September.

James W. Selby, Jr. has joined the Insecticide Division as head entomologist of the Southeast Division. He holds degrees from Texas A. & M. and has worked with the U.S. D.A. on cotton insect control in Texas.

Am. Potash Meeting

Fifteen key employees from American Potash & Chemical Corporation's four principal sales offices in the United States held a four-day conference at the company's plant at Trona, California recently.

The meeting was directed by William J. Murphy, New York, American Potash & Chemical Corporation vice-president in charge of sales. Others from the New York office who attended were Edward Kolb, sales manager; Robert M. Curts, borax sales manager; Alfred de Ropp, soda products sales manager; Nelson E. Wandt, salesman; and E. A. Graupner, export salesman.

The Chicago sales office was represented by C. A. Lawton, manager of midwestern sales and D. S. Castagne, salesman. Present from the Atlanta (Ga.) office were C. L. Straughan, manager of Southern

sales, and W. W. Young, salesman.

Los Angeles personnel at the meeting included D. B. Scott, manager of western sales; H. J. Bensinger, assistant manager of western sales; S. C. MacMurray, western potash salesman; R. N. Hoh, soda ash salesman; and D. A. Lundy, sales service, bromine and borax sales.

Insect Tests Reported

The U. S. Dept. of Agriculture has issued bulletin E-826, "Preliminary Tests of Synthetic Organic Compounds as Insecticides, Part VII," by G. T. Bottger and A. P. Yerington and S. I. Gertler. Complete data is given on 95 compounds not previously reported. Four lengthy tables of data are presented, giving the name of the compound, the concentration, the insect to be controlled, its stage, feeding, average deposit per square centimeter and average kill after periods of 1, 2 and 3 days. The bulletin was published by the Bureau of Entomology and Plant Quarantine, Washington 25, D. C.

N. E. Weed Conference Program Planned

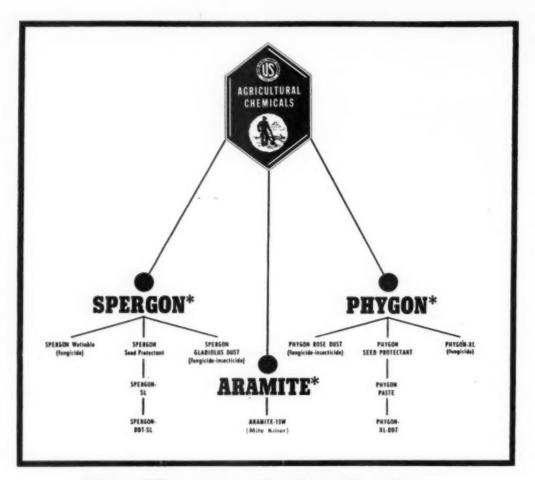
FFICERS of the Northeastern Weed Control Conference have completed the program for the 1952 annual meeting to be held at the Hotel New Yorker in New York, January 2, 3, and 4.

In charge of the three-day program are W. H. Lachman, Amherst, Mass., chairman, coordinating committee; C. E. Phillips, Newark, Del., program chairman; Walter Baran, New York, local chairman; R. M. McLaughlin, Westchester County Department of Health; C. E. Minarik, Frederick, Maryland, vice-president; S. M. Raleigh, State College, Pa., president; and W. C. Jacob, Riverhead, N. Y., secretary-treasurer.

The conference has membership from 13 northeastern states.

The program will include latest reports on control of ragweed, marijuana, poison ivy and brush; as well as a special session on control of woody plants. A panel has been selected to discuss this subject, according to Dr. Carew, program chairman. Participating in the discussion will be Fred A. Ashbaugh, West Penn Power Co.; Robert Beatty, American Chemical Paint Co.; Walter A. Rodwell, Public Service Co. of New Hampshire; Arne E. Carlson, E. I. duPont de Nemours and Co.; Frank Egler, Aton Forest, Norfolk, Conn.; David P. Hackett, Harvard University: and Robert Morrow, Jr., Cornell University.

The conference opens Wednesday, January 2, with general sessions which include talks on evaluation of chemicals, equipment, growth control agents, livestock poisoning, and soil sterilants. Wednesday the group will be divided into the following sections; horticultural crops; agronomic crops, turf; woody plants; special problems and public health. The report of the research coordinating committee will highlight Friday's meeting.



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Needless to say, this is a great source of satisfaction to us—and an incentive to discover and manufacture even finer products for the future.

*Reg. U. S. Pat. Off.

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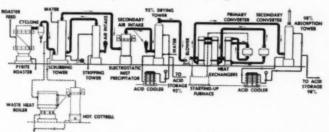
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NAUGATUCK, CONN.

Also manufacturers of insecticides-Synklor-48-E, Synklor-50-W

Brazilian Plant to Utilize Pyrites

A N order has been placed with the Chemical Construction Corporation by Brazil Export Company, both of New York, for a 60 ton contact sulfuric acid plant that The new pyrites-burning plant, of 60 ton capacity, has been specifically designed by Chemico engineers in answer to the existing world-wide sulfur shortage.



will utilize a form of pyrites known as "coal brasses" for the raw material. The plant will be erected, as another step in an extensive expansion movement, for the SA Reunidas F Materazzo, a large South American company noted for the production of synthetic yarn.

This will be the third plant supplied by Chemico for the same client and installed in the same city, Sao Paulo. The first plant, one of 25 ton daily capacity, was built in 1936 and resulted in a subsequent order for a 30 ton plant in 1950.

This installation will utilize "coal brasses," a local sulfur-bearing ore containing 40% sulfur and 4% to 10% carbon. This move by the South American company typifies the action of many acid manufacturers who are planning to use local raw materials due to the sulfur shortage. Chemico engineers have designed plants which can produce sulfuric acid from refinery, steel mill and titanium pigment manufacturing byproducts, smelter, coke oven and natural gases, low grade surface deposits and various pyrites.

Cloney to Antara Div.

James M. Cloney has been appointed product manager for surfactants and related chemical products of Antara Chemicals, a division of General Dyestuff Corporation, 435 Hudson Street, New York 14, N. Y., it has been announced by Harold G. Shelton, manager of the division.

Mr. Cloney formerly handled sales of all Antara products on the West Coast, with headquarters in San Francisco.

A graduate of Kalamazoo College (A.B. 1941), Mr. Cloney joined Antara in 1947 as a field salesman, working out of the New York office.

CSC Plant Under Way

The new plant of Commercial Solvents Corporation to produce nitrogen solutions for the fertilizer industry is now in operation at Sterlington, Louisiana, the company has announced. A second unit, already under construction, is scheduled to be in production by January.

Brown, A & S Vice-Pres.

S. S. Yates, president of Arkell and Smith's, oldest U. S. paper bag manufacturer, has announced the election of Ernie E. Brown as vicepresident at a recent meeting of the Board of Directors. Mr. Brown has been associated with the paper industry for many years, and will make his headquarters at the Company's New York office, 500 Fifth Ave.

C.E.M.A. Elects Ostrand

G. Walter Ostrand, general manager, Caldwell Plant of Link-Belt Co., Chicago, was elected president of the Conveyor Equipment Manufacturer's Association at the group's annual meeting at the Homestead Hotel, Hot Springs, Va., October 30. He succeeds L. B. Mc-Knight, Chain Belt Company.

Wisconsin Book Out

"Mineral Nutrition of Plants" 483 pages, 86 illustrations, University of Wisconsin Press, Madison, Wis., \$6.00, with Dr. E. Truog as editor and author of one chapter, "Soil as a Medium for Plant Growth." The book is divided into six parts, each with a number of sub-divisions. The divisions are entitled, "Mineral Nutrition of Plants," "Physico-Chemical and Biological Factors Affecting Nutrient Availability in Soils," "Mechanism of Entry and Translocation of Mineral Nutrients in Plants:" "Some Field Problems in Plant Nutrition;" "Role of Minerals in Plant Nutrition;" and "Modifying Influences of Various Environmental Factors Upon Mineral Nutrition."

Contributors to the various chapters in the book, in addition to editor Truog, of the University of Wisconsin, included C. Edmund Marshall, University of Missouri; Roy Overstreet, University of California; L. A. Dean, U.S.D.A., Beltsville, Md.; Hans Jenny, University of California; J. B. Page, Ohio State; G. B. Bodman, University of California; A. G. Norman, U. S. Army Chemical Corps., Frederick, Md.; T. C. Boyer, U. of California; Hans Burstrom, University of Lund, Sweden; O. Biddulph, State College of Washington; Damon Boynton, Cornell University: Jackson B. Hester, Campbell Soup Co.; Daniel I. Arnon, U. of California; W. F. Loehwing, U. of Iowa; Robert A. Steinberg, U. S. D. A., Beltsville, Md.; Robert B. Withrow, Smithsonian Institution, Washington, D. C.; C. H. Wadleigh and L. A. Richards, U. S. Department of Agriculture, Riverside, Calif.; and Harry F. Clements, U. of Hawaii.

In this concise and compact volume are presented the latest views regarding the availability of mineral nutrients in soils and mechanisms of absorption and translocation of these mineral nutrients by plants.



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N. Central Weed Conference Being Held

THE 8th annual meeting of the North Central Weed Control Conference was to be held in the Biltmore Hotel, Oklahoma - City, Okla., December 9-13, with a complete program of technical papers and discussions of chemical weed control for the five-day meeting.

Committee meetings were scheduled for Sunday night and Monday, December 9 and 10, with the official opening of the conference being held on Tuesday with Clyde Bower, Oklahoma State Dept. of Agriculture, as chairman. Dr. E. P. Sylwester, Iowa State College, N.C.W.C.C. president, was to make his annual address, followed by words of welcome by Oklahoma City's mayor, Allan Street. L. M. Stahler, U. of Missouri, Columbia, was to complete the morning's program with a talk, "Where Do We Stand in Weed Control?'

That afternoon Dr. Sylwester was to be in charge, with Ernest Hart, president of Niagara Chemical Division, Food Machinery Corp., Middleport, N.Y., and immediate past president of the National Agricultural Chemicals Association, addressing the group on the role of industry in weed control. George Avery, director of the Brooklyn Botanic Gardens, wae to discuss growth regulants.

The group was then to divide into five sections: Industry; Regulatory Weed Control Work; Extension; Horticultural; and Aerial spraying and engineering.

Drs. Sylwester and Stahler were to be on the industry program, as were K. P. Buchholtz, Univ. of Wisconsin, S. H. Baer, Niagara Chemical Div., Middleport, N.Y., and Wm. Haude, Pittsburgh Agricultural Chemical Co., New York, who were to comprise a panel on the subject of "Working Together, Industry and State."

Sig Bjerken, U.S.D.A., St. Paul, Minn., was to be chairman of the group on regulatory work. Appearing on this portion of the proprogram were to be Dwight W. Lambert, Lincoln, Neb.; J. L. Hutchin-

son, Topeka, Kansas; T. L. Aamodt, St. Paul, Mina.; Clyde Spry, Des Moines, Iowa; Charles J. Gilbert, Brookings, S.D.; G. R. Sterling, Edmonton, Alberta, Canada; and Warden L. Noe, Topeka, Kansas.

The session on Horticulture was to be headed by B. H. Grigsby, Michigan State College, with a number of technical papers being presented. Two of these were by industry representatives, L. L. Coulter, Dow Chemical Co., Midland, Mich., and J. H. Standen, B. F. Goodrich Chemical Co., Cleveland, Ohio.

John H. Burke, Oklahoma City, and S. W. McBirney, Columbia, Mo., were to be chairman and co-chairman, respectively, of the session on aerial spraying and engineering. Speakers were scheduled to include William T. Piper, Piper Aircraft Co., Lock Haven, Pa.; Kenneth Messenger, U.S.D.A., Oklahoma City; and George Childress, Civil Aeronautics Authority, Washington, D.C. This portion of the program was to hear reports on the development of aircraft, dispensing equipment and ground equipment for application of agricultural chemicals.

An evening session was to feature papers by E. G. Rogers, Gainesville, Fla.; George Friesen and P. J. Olsen, Winnipeg, Canada; E. B. Oyer, George A. Gries and O. C. Lee, Purdue Univ., Lafayette, Ind.; J. R. Hansen and K. P. Buchholtz, St. Paul, Minn., and Charles L. Hamner, Michigan State.

Scheduled for Wednesday's program were talks by R. S. Dunham, St. Paul, Minn.; George McCall, E. I. duPont de Nemours & Co., Inc., Wilmington, Del.; Deane Finnerty, Lincoln, Nebraska, and Harold Hutton, president of the Oklahoma State Board of Agriculture, chairman of the morning session.

L. M. Melander, Minneapolis, Minn., was to be chairman of the afternoon session in which a panel was to be presented under the leadership of H. L. Hansen, St. Paul, Minn. Taking part in the panel were to be Maurice W. Day, Sault Ste. Marie,

Mich.; H. M. Elwell, Guthrie, Okla.; R. H. Beatty, American Chemical Paint Co., Ambler, Pa.; and L. L. Coulter.

The final day's program was to open with R. J. Jones, Stillwater, Okla., as chairman, and featuring talks by C. J. Willard, Ohio State U.; V. K. Rowe, Dow Chemical Co., Midland, Mich.; Dr. Sylwester, and Roy L. Lovvorn, chief, Division of Weed Investigation, U.S.D.A., Beltsville, Md.

The afternoon chairman was to be J. W. Zahnley, with the following persons appearing on the program: W. P. MacDonald, Minneapolis, Minn.; John Green, Stillwater, Okla.; W. F. Slife, Urbana, Ill.; W. C. Dutton, Dow Chemical Co.; R. H. Wellman, Carbide & Carbon Chemicals Div., Union Carbide & Carbon Corp., New York; E. C. Tullis, Frederick, Md.; Dale E. Wolf, E. I. duPont de Nemours & Co., Inc., Wilmington, Del.; K. C. Buchholtz and L. G. Holm, Madison, Wisc.; and W. C. Dutton, Dow Chemical Co.

FERTILIZER LAWS

(Continued from page 48)

Footnotes

- 25. Vn. Code Ann. 1950, c. 8 sacs. 3 80 et seq., as amended by P.L. 1956 c. 61 lll. Rev. Stat. 1947, c. 5, secs. 47 et seq. 27. Burns' Ind. Ann. Stat. 1950, c. 10, secs. 15-1901 et seq. 28. Iowa Code Ann. 1946, c. 200 secs. 2001
- et seq. 29. Kan. Gen. Stat. Ann. 1949, secs. 2-1201 et seq.
- et seq.

 30. Ky. Rev. Stat. 1946, secs. 250,360 et seq.

 31. Mich. Stat. Ann. 1935, 1949 Supp., secs.

 12.161 et seq., as amended by P. L. 1936

 Act. No. 13

 32. Minn. Stat. Ann. 1950 Supp., secs. 17.201
- Minn. Stat. Ann. 1950 Supp., secs. 17.201 et seq.
 Neb. Rev. Stat. 1950 Supp., secs. 81-2158 et seq.
 N. D. Rev. Code, 1943, 1949 Supp., c. 19-20
- et seq.
 34. N. D. Rev. Code 1943, 1949 Supp., c. 19-20
 35. Page's Ohio Gen. Code 1950 Supp., secs.
 1139 et seq.
 36. S. D. Laws 1949, c. 85

V-C PLANT OPENS

(Continued from page 41)

A. C. methods. This force checks not only the output of the Cincinnati plant, but also that of other midwest plants at Dubuque, Iowa; Ft. Wayne, Ind.; St. Louis, Mo.; and Memphis, Tennessee. Company officials declare that the policy pays for itself in improved customer relations, since farmers are impressed by the firm's apparent effort to maintain high quality.

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Another important part of the plant is its sulfuric acid department where elemental sulfur is burned to produce sulfuric acid which in turn is reacted with phosphate rock in the manufacture of superphosphate. As is the case with other plants having similar setups, the sulfur is shipped northward from Texas by 500-ton barges, and then transshipped by rail to the plant. In the case of the new V-C plant at Cincinnati, the element is unloaded by a small crane and stored near the building where the sulfur is burned.

The process is accomplished through the Leonard-Monsanto plant, with a capacity of 40 tons of 100% acid per day. Heat generated in the burning process is utilized to create steam which in turn is used to operate steam engines for turning blowers that fan the brimstone fire. Mr. Harding characterized the process as "something like perpetual motion . . . the fire burns sulfur which makes steam which runs blowers which makes the fire burn hotter to create more steam."

Following the acidulation process, the green superphosphate is transported to a 160-ton bin, by belt conveyor, then moved by the crane to larger storage bins where the material is allowed to cure sufficiently.

Phosphate rock is stored in three 300-ton Marietta concrete stave silos. Each silo is equipped" with a feeder to put the material either in or out, so the work may be done entirely mechanically. The phosphate rock itself is mined by V-C in its Florida development, and shipped northward by rail.

APS-AAEE MEET

(Continued from page 43)

day and Wednesday mornings, and a joint meeting with the ESA for Wednesday morning, when motion pictures on entomological subjects were to be shown. A joint meeting with the Potato Association of America was scheduled for Thursday afternoon.

The annual banquet was set

for Tuesday evening, and a program of entertainment to follow, according to the program.★★

YAKIMA MEETING

(Continued from page 83)

joint session with the Washington State Weed Association for the noon luncheon and afternoon meetings. Dr. Mark T. Buchanan, Director of the Washington Agricultural Experiment Stations, presented the lunchcon address. A panel composed of Dr. Lowell Rasmussen, associate agronomist, W.S.C., Pullman; Dr. Walt Clore, associate horticulturist, Irrigation Experiment Station, Prosser; Henry Wolfe, extension weed specialist, W.S.C., Pullman; and Auburn Norris, State weed supervisor, Washington State Department of Agriculture, warned of the drift hazards encountered with 2,4-D aircraft application. The use of the 2,4-D amine rather than the ester form of



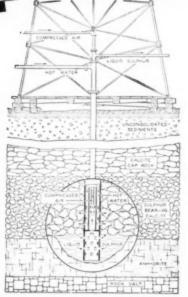
SULPHUR

*Interesting Facts Concerning This Basic Raw Material from the Gulf Coast Region

*WELL PIPING

The well equipment consists of pipes of various sizes, placed ane within the other and extending from the surface into the sulphur deposit. A 10" or an 8" casing extends to and rests on the top of the cap rock. A 6" pipe, inside the casing, passes below it and reaches into the barren anhydrite. It is perforated at two different levels, separated by an annular collar. The upper set of perforations permits the hot water to enter the sulphur formation and the lower set permits the entrance of the molten sulphur to the discharge pipe fitted inside the 6" pipe.

When a well is "steamed" the hot water passes down the annular space inside the 6" pipe and outside the sulphur pipe and flows through the upper set of perforations into the porous formation. The entire mass through which the hot water circulates is raised to a temperature above the melting point of sulphur. The liquid sulphur being heavier than water, makes its way downward to form a pool and displaces water around the foot of the well, and rises in the well column through the lower perforations into a 3" pipe which is the sulphur discharge pipe. Compressed air released at the bottom of still another pipe fitted inside the 3" pipe rises and mixes with the sulphur column, forming an air lift which raises the liquid sulphur free of water to the surface.



Loading operations at our Newgulf, Texas mine



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the compound would reduce damage to neighboring crops.

A second panel discussion presented the applicators' viewpoint on the subject of aerial application of herbicides. Vern St. John, Bob Allison and L. L. Friedrich emphasized steps to be taken before spraying an orchard or a field, so that the neighbors adjacent to the sprayed areas will be informed of the operation. Such practices would foster better relations between grower and applicator.

The State Department of Agriculture was represented by Tom Carter and Joe MacCauley, who told of regulations and enforcement pertaining to aircraft application of spray materials.

TECHNICAL BRIEFS

(Continued from Page 63)

the IPC with the rhizome and stolons of the undesirable grass.

—Summary of "Some Factors Influencing the Herbicidal Efficacy of Isopropyl N Phenyl Carbamate," by Virgil H. Freed, Agricultural Experiment Station, Corvallis, Oregon, in Weeds, Journal of the Association of Regional Weed Control Conferences, Vol. I, No. 1, October, 1951.

GUEST EDITORIAL

(Continued from Page 30)

Lead is extremely short and is expected to greatly curtail the production of lead arsenate. The use of this material will have to be supplemented with other insecticides. Besides a shortage of lead, growers face the possibility of a critical shortage of the copper fungicides. Although this has been specifically brought to the attention of various government officials, there appears to be little opportunity to alleviate the situation.

Since so many of our organic pesticides depend on the available supply of benzol and chlorine, production of pesticides must be affected by an inadequate supply. We must face shortages of these basic chemicals for at least two more years, based on present rates of expansion.

The supply of containers for shipment of pesticides was a problem during the 1951 season and remains so now. The situation on containers looks fair at present, but is dependent on so many unknown factors that there is no definite assurance that an adequate quantity of containers will be made available for agricultural chemicals.

The export of pesticides has become an important addition to furthering international relations. The use of these materials in the production of food and in protection of the health of friendly nations is becoming increasingly important. Exports of pesticides will be increased substantially during 1952 and the industry must make the required amounts available for that purpose.

All of these factors are now making the production of an adequate supply of agricultural chemicals a real concern. Over-confidence

WETTABLE POWDER INSECTICIDE SUSPENSIONS

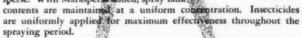
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as to the 1952 supply situation on the part of growers and dealers, simply because there are substantial out-of-season inventories, may bring about a false sense of security which makes the situation doubly dangerous.

The industry is concerned about the piling up of agricultural chemicals in warehouses. Storage space will be rapidly exhausted and production stopped unless stocks move into the hands of dealers and growers.

In addition, if there is a rush for agricultural chemicals just prior to the season of use, stocks will be depleted with insufficient time left for the manufacture and distribution of additional quantities for use during the 1952 season. This can cause a serious inadequacy even though the industry has the capacity to produce and distribute the necessary amounts.

One special reason the 1951 production and distribution met the requirements of agriculture, was because the growers and dealers accepted at least part of their anticipated needs prior to the season of use. Unless they do so again in 1952, there is a serious threat to the supply of agricultural chemicals adequate to protect the nation's food, feed and fiber production. Industry needs the cooperation of all the interested factions to produce and distribute these valuable products.

WASHINGTON

(Continued from page 73)

limitation permits a user to have a bit more comfortable supply of material on hand.

The industry is still awaiting the outcome of the other limitation orders on sulfuric acid, carbon disulfide and sulfur which were postponed. These orders were originally to have gone into effect November 1st.

The Office of International Trade of the Department of Commerce announced that effective at midnight November 12, all experts of copper sulfate would require licenses. A period of grace was given up to December 8th on materials enroute, in transit, or at the port ready for export. However, after December 8th, all shipments of copper sulfate will required validated export licenses.

This action was made necessary by shortages of copper sulfate existing in U. S. agricultural and industrial channels. A rather large portion of 1950 production was finding its way into the resale market for export to countries which did not normally purchase their copper sulfate requirements from the U. S. It was known for example that France. Greece, Spain and the Argentine, among others, had placed rather heavy requirements of copper chemicals on the U. S. Normally, some of these countries purchased material from European sources, or in the case of France, are in themselves rather large exporters of copper sulfate in normal

Copper sulfate production in 1951 in the U. S. was probably at its greatest post-war level and it is felt that on the basis of this action by OIT. that there will not be any shortages of copper sulfate for agricultural use during the 1951-52 season.

INSECTS

(Continued from page 71)

Insectory. Of special interest to the entomologists was a series of field plots designed to test the effects of some of the newer insecticides on beans, milo maize, and cotton growing in different types of soils receiving insecticide dosages comparable to those used in insect control.

The executive session in entomology on Thursday was devoted principally to a discussion of plans for the issuance of the "Suggestions for the Control of Tobacco Insects for the Season 1952," based upon the information brought out in preceding sections of the program. The formulation of these suggestions was asigned to sub-committees representing each of the principal tobacco types consisting of flue-cured, dark fire-cured, and burley, cigar tobacco, and stored and manufactured tobacco. When the final reports of these sub-committees are received the suggestions on the control of tobacco insects in 1952 will be assembled. Copies will probably be available for distribution some time in February as in past years.

Norman Allen, USDA, Florence, S. C., was elected chairman and G. D. Jones, extension entomologist of North Carolina, was elected vice-chairman and secretary, of the next conference, scheduled to be held at Raleigh, N. C., in 1953. The conference adopted the policy of convening only twice during each three-year period, alternating between early-summer and mid-autumn sessions.**

TOTMAN

(Continued from page 57)

pany's letterhead. About half a million sheets of these have been sold.

Cooperative Research

URING the entire period of its existence the NFA has worked in close cooperation with the state agricultural experiment stations, and these contacts continue in even greater degree. We continue our many years of cooperation with government agricultural agencies, particularly with the fertilizer research activities of the Bureau of Plant Industry, Soils, and Agricultural Engineering. These cooperative activities have been so helpful and so effective in results to agriculture in the past that we have made arrangements for similar research work with the Tennessee Valley Authority. A memorandum of understanding has been accepted by both organizations and special technical committees from each have already met to discuss future plans. Representatives of the Atomic Energy Commission and of the Department of the Interior are attending such conferences for mutual benefit. We believe the vast research facilities of the TVA can be used to great advantage in helping to solve some of the industry's technical problems.

Tonnage Outlook

THE demand for fertilizer continues to mount. The requirement for more and more food for domestic use and for export to our forces overseas, and to our allies, can only be met through greater use of plant food. Our productive acres are already all at work and the necessity is to make each of them work harder by employing all the best methods of crop production including better tillage, better seed, better drainage in

some areas and additional irrigation in others, and above all, use of optimum amounts of plant food.

Fertilizer consumption in the calendar year 1950 reached an alltime high of 18,300,000 tons. Estimates indicate that consumption for the fiscal year ended June 30, 1951, probably reached 19,000,000 tons. Presently it appears that for the 1951-52 fiscal year there should be materials available to manufacture about 19,500,000 tons of fertilizer. Certainly this will not meet the demand and by no means the tonnage that could be profitably used or that is necessary to produce our needed crops, and in addition to adequately maintain the fertility of our soils. Under our present national economy set-up, it would seem that the demand for plant food would continue to grow each year.

At present our industry still has excess manufacturing capacity considerably beyond the supply of raw materials, and it is incumbent on us, in my opinion, to continue to make every effort to supply the consumption demand for fertilizers as equitably as these supplies will permit. It is a period of national emergency possibly even approaching a national crisis. Our industry will no doubt be called upon to make further sacrifices similar to our reduction in obtainable sulfuric acid. We must do our part. At the same time we must lend every effort as an industry to see that agricultural production is not handicapped through our industry not receiving its proper proportion of construction and upkeep materials and its full share of scarce raw materials.

We again pledge our every effort to the end that our domestic agriculture shall receive every pound of plant food that can be produced in order that it may fulfill its production goals.*

CFA MEETING

(Continued from page 53)

amazing array of things: it will keep pears, apples, and citrus fruit on the tree; it will prevent leaf drop after use of insecticidal sprays; it will improve the keeping quality of lemmons: it will improve keeping quality of potatoes when the foliage is sprayed with it before harvest time; it will improve the color of certain red potatoes; it will ripen bananas; it will put roots on stems in the most unusual places; it will cause pineapple plants to flower and do many other things. Yet the same compound at higher dosages will kill plants.

Turning to the subject of de-

foliants, the speaker reported that defoliation proper takes place at the base of the leaf petiole. Here is located a specialized tissue which disintegrates when defoliation takes place. Deciduous trees drop their leaves upon relatively weak stimuli such as a lengthening of the night accompanied by a moderate drop in temperature. Cotton does not belong to this group of plants and requires a much stronger stimulus before it will drop its leaves. A night frost

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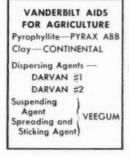
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at the proper time is required. It is understandable, therefore, that a highly active chemical is required to produce the effects of such a frost artificially. This is exactly what the commercially successful cotton defoliants do. In certain crops it is only necessary to dry up the leaves, and complete defoliation is not necessary. Potatoes, seed alfalfa, and beans are a few examples. In such cases also, compounds are used which induce the physiological effects of an early frost.

Fertilizer Use in Calif.

THE Soil Improvement Committee session took up the afternoon of November 2. Dr. W. E. Martin, California Agricultural Extension Service, spoke on "Efficiency of Various Sources of Phosphorus and Correction of Deficiencies in California Soils." This investigation was suggested to the California Agricultural Extension Service by the Soil Improvement Committee. On the basis

of work done to date, Dr. Martin presented preliminary data comparing normal superphosphate, ammoniated superphosphate and highly ammoniated superphosphate on the basis of available phosphoric acid, all with equal nitrogen. With acid soils, he stated, it is possible to ammoniate in substantial amounts, but not with alkaline soils.

Fertilizer was cited by George J. Harrison, principal agronomist, U. S. Cotton Field Station, Shafter, Calif., as one of the most important of the "Past and Present Factors Contributing to the Success of Cotton Culture in California." Use of fertilizers, the speaker indicated, is just beginning to have its impact on cotton culture in California. After many abortive attempts to use fertilizers. particularly nitrogen, success is beginning to be met with in nearly all cotton growing sections of the state. In reviewing the fertilizer trials over the past 18 years it now appears that there may have been several factors

contributing to early disappointments. First, with only a limited cotton acreage, rotation with alfalfa was the general practice; second, insufficient fertilizer was generally used and third, the time of application of both fertilizer and summer irrigation were so long delayed that any benefits that otherwise may have been derived were nullified. There are now many good returns being derived from the judicious use of nitrogen in particular, and there are numerous instances where phosphate is now essential for successful cotton growing. Other deficiencies are beginning to come to light but as yet their boundaries are not well defined."

"Fertilizers Aid in Establishing Soil Conservation Practices," was the title of a paper by L. R. Wohletz, soil scientist, Soil Conservation Service, U.S.D.A. The Soil Conservation Service in California, said Mr. Wohletz, emphasizes the important secondary benefits which accompany fertilizer use rather than the direct pro-

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duction phases of fertilization.

Fertilizers must be added to many soils of the state, he reported, to correct soil deficiencies before soil conserving crops and practices can be fully effective. For example:

- 1. To stimulate early fall growth of cover crops to protect sloping land against soil losses from early storms by proper fertilization cover crops of good volume can be turned down early in the spring to reduce moisture extraction. Late spring rains falling on a soil protected by an organic mulch will be absorbed to replenish soil moisture used by the cover crop. Here proper fertilization performs two essential functions—promotes early ground cover and provides volume of growth for a protective organic mulch.
- 2. To stimulate soil building legumes on dry sand grain and grazing land. Recent studies by Dr. John P. Conrad. California Agricultural Experiment Station, have shown some spectacular legume responses to gypsum, sulfur and phosphate fertilizers. These legume responses are particularly significant because of the importance of getting legumes established in soil conserving rotations for the extensive dry farmed grain areas in California. The resulting improvement in the carbon-nitrogen ratio of crop residues enables the use of mulch tillage methods without a depression of crop yields.
- To stimulate early season growth of erosion control vegetation on excavations, earth fill dams, road cuts, and badly eroded areas.

Frequently the indirect as well as direct benefits from fertilization are vitally important in establishing soil conservation practices. For example the 5-year results from fertilization of annual-type range at the SCS nursery, Sunol, California disclose that annual applications of 200 pounds per acre of ammonium phosphate since 1944 gave the following results:

l. Increased forage production by an average of 2,882 pounds which is equivalent to 3,80 animal-unit months of forage per acre.

Reduced year to year fluctuations in production. Advanced the date of grazing readiness by six weeks from March 15 to February 1 (average of five years).

Doubled the length of the green feed period.
 S. Provided adequate residue for

erosion control.

John P. Conrad, Sulphur Fertilization in California and Some Related Factors, Soil Science, Vol. 70, No. 1, July 1980.

A detailed report on these results is to appear in a forthcoming issue of the Journal of Range Menagement.

Speaking on "Agricultural Accomplishments Through Soil Testing," Dr. J. Fielding Reed, southern manager, American Potash Institute. reported that while soil testing has proved to be a very helpful diagnostic aid in the eastern part of the United States in improving agricultural yields over the past twenty years, the problems involved grow more complex as soil testing begins to be applied more widely in the west, and the tests themselves must be changed and adapted as they are applied in a different geographical area. Some chemical tests, for instance, such as those for calcium,

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NATIONAL AGRICULTURAL CHEMICALS ASSOCIATION

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magnesium or lime requirement, would hardly be needed in most western soils. Other tests such as those for soluble salts, accumulations of alkali, etc., might well replace them in a soil testing program for western soils.

Reporting on "Twenty-Five Years of Soil and Soil Fertility Research in California," Dr. H. D. Chapman acting director, Citrus Experiment Station, Riverside, Calif., observed that a backward look "shows enormous progress in our knowledge of soils and soil fertility problems." He reviewed a number of the developments the years have brought, including new methods of fertilizer application such as nutritional sprays, irrigation water distribution and injection of ammonia gas.

"With the wider application of soil conservation methods, increased vields from soil researches, use of soil fumigation, development of new acreages plus development of higher yielding strains and varieties of plants, there will be a greatly increased demand for plant food in the future," he predicted. The needs, however, Dr. Chapman warned, "are going to vary greatly from crop to crop, and soil to soil, and the fertilizer industry must be prepared to sell to the farmer what he actually needs-not what at the moment may be the most profitable. The latter policy is not enlightened self interest. We have abundant evidence that some soils have already been too heavily fertilized with phosphate and potash, thereby reducing yields and tree growth. Less fertilizer is thereby sold because of decreased need and the farmer's lessened ability to pay for it. It is self-evident that in the long pull the fertilizer industry will serve itself, agriculture, and society best by selling what the soil and crop requires. It is the job of those of us in research to develop more and better diagnostic tools for determining individual soil and crop needs."

Concluding the program was a talk by H. R. Krueger, director of technical service, Fertilizer Sales Div., Phillips Chemical Co., Bartlesville, Okla., reporting on progress which has been made with the safety program for the fertilizer industry currently being sponsored by the National Safety Council. He emphasized the high accident rate in the fertilizer industry, and warned that a plant with a poor accident record will not attract the more desirable type of labor. Triple payment is exacted for accidents, he counseled: first by the injured in pain, suffering and sometimes loss of life; second by the injured's family in worry, sor-

row and loss of income; and third by the employer in high insurance costs and loss of productivity.

As to the benefits from a safety program, the speaker indicated that they might also be triple: first to the owners in savings on insurance and greater productivity; second to the operators and supervisors in having a more efficient plant to operate; and finally to the worker by making the plant a happier, healthier, safer place in which to earn his living.

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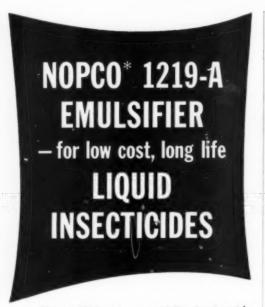
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S Distribution Studied

The Phosphate Fertilizers IAC has recommended to the NPA U. S. Department of Commerce, that a special task committee be appointed to study the advisability of issuing distribution orders to assure equitable availability of supplies of sulfuric acid and bulk superphosphates.

The recommendation was made at a recent industry advisory committee meeting at which NPA officials reviewed the supply-demand pattern for sulfur and sulfuric acid.

NPA stated that the proposed sulfur and sulfuric acid limitation order which is presently under consideration would bring these materials under control and achieve a statistical balance between supply and demand. However, the problem of distribution would permit serious practical difficulties with considerable dislocation as to availability of supplies of both sulfur and sulfuric acid in different parts of the country and as to availability to individual companies, officials said.

The members of the committee expressed general agreement with the proposed program of the DPA to limit the use of sulfur on a plant basis provided a company could adjust its allowable over-all use among various plants without causing serious maladjustment of acid availability within an area. The majority of the committee favored a company basis rather than a plant basis in obtaining supplies of sulfuric acid for any uses.

NPA presented figures which showed that superphosphate production for the calendar year 1950 dropped from a high of 2,495,067 tons during the second quarter to a low of 2,008,642 tons in the third quarter. Average monthly production of superphosphate by quarters was as follows: 1st quarter, 782,000 tons: 2nd guarter, 831,600 tons; 3rd quarter, 670,000 tons; and 4th quarter, 812,900 tons.

A representative of the Dept. of Agriculture stated that the indicated soluble superphosphate requirements (expressed as PsOs) for the calendar year 1952 would amount to 2,650,000 tons or 200,000 tons

more than present forseeable production. NPA stated that the special task committee to consider distribution orders would be appointed.

The following members of the committee were present: John R. Schlerm, George W. Gage, C. T. Cunningham, J. E. Nunnally, R. L. Hockley, E. W. Forkin, J. W. Rutland, J. C. Dean, J. C. Leppart, M. G. Field, Ralph E. Fraser, C. D. Shallenberger, R. S. Tydall, F. W. Darner, Raymond R. Hull, and William R. Thurston.

N F A MEETING

(Continued from page 39)

promise, it is possible to project the tonnage needed, Mr. Porter said.

A population increase of 1.6% in 1951 will create a need for 240,000 tons of N, but better farm practices may reduce this need. As to steel requirements, a single ton of steel equals five tons of nitrogen per year, or 100 tons of grain per year, or 20 tons of meat.

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Head Office: 641 South Fourth St., Richmond, Calif. Branches: Sacramento, Fresno, Bakersfield, Pamona. To affect a balance between the projected supply of nitrogen and other materials necessary for fertilizer production, the annual need for N by 1955 would be 2,185,000 tons; K_2O , 2,185,000 tons and P_2O_3 , 3,500,000 tons. With these figures, the need for sulfur would be nearly 2 million tons. Mr. Porter added, that if we are to balance, the industry will have to find ways to use materials other than sulfuric acid and sulfur for full production.

Cedric Gran, consultant, agricultural chemicals division. Office of Price Stabilization, Washington, reviewed the 10-month history of the General Ceiling Price Regulation. and revealed some of the problems in connection with selecting an industry committee which fulfills the requirements for a well-rounded group. He said that selections were made with consideration to geography, and an attempt to get representatives of both large and small business. Manufacturers' CPR 22 will go into effect on December 19, 1951. This does not cover the pricing of sulfuric acid, nor does it affect businesses whose sales of goods they manufacture is less than \$250,000. Manufacturers, therefore, who come under CPR-22 must arrange to comply by December 19, unless a countermanding order is given.

Mr. Gran stated that the Capehart amendment makes July 26, 1951 the cut-off date for computing labor and material cost increases. The supplement also takes into consideration all cost increases, including increases in overhead costs, he said. The exception is such costs considered unreasonable or excessive.

He said that work is being done on a tailored regulation for mixed goods, which would be a dollar-and-cents ceiling regulation on retail sales of superphosphate and mixed goods. This will be ready by January 1, Mr. Gran indicated. In view of this, he said that the agricultural chemicals division has requested that the December 10 filing date be suspended so far as fertilizers and fertilizer materials are concerned. (OPS on Nov. 29 issued Amendment 4 to

CPR 22. Details on green sheet, between pages 86 & 87, this issue. Ed.)

Uranium Extraction

THAT production of unspecified amounts of uranium is possible through wet-process phosphoric acid was told to the group by Sheldon P. Wimpfen, Division of Raw Materials, Atomic Energy Commission, before the NFA group on Wednesday.

Although the amount of uranium present in most marine phosphate rock ranges from only one-tenth to four-tenths of a pound per ton, the ABC is interested in recovering this amount of the element, the speaker said. Heretofore, the uranium contained in the rock has not been removed, but has been spread over agricultural areas for many years. Experiments have indicated that the extraction of the element from phosphate rock, in no way impairs the plant food value of such fertilizers.

One major drawback was noted in developing the idea, Mr.



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| Typical Analysis | Hi-Solv 30 | Hi-Solv 473 |
|------------------------|-------------|-------------|
| Distillation Range, °F | 266-374 | 400-520 |
| Specific Gravity | 0.830-0.840 | 0.900-0.915 |
| Color | Water White | Light Straw |
| Flash Point | 80° F—TCC | 180° F—COC |



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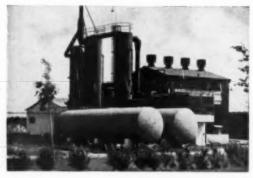
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of activities within the industry month after month. DON'T LET YOUR SUBSCRIPTION EXPIRE! Keep abreast of the continual advancements being made by the trade. Get the habit of reading.

Agricultural Chemicals

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Wimpfen reported, and that was that only about a million tons of phosphate rock per year was used in commercial plants to make wet-process acid. As the tonnage of rock used to make normal superphosphate is much larger, research continues to seek a means of recovering uranium from normal superphosphate, he said.

Last year, pilot plants were set up and at the present, one full scale production plant is under construction to recover uranium from wet-process phosphoric acid.

The production of by-product uranium from phosphate rock will grow with the trend towards the production of more concentrated fertilizers, he said. To accelerate the recovery of important tonnage of uranium from this source, AEC has encouraged the expansion of existing facilities and the construction of new ones to make wet-process phosphoric acid. Producers who can apply the technical data to uranium recovery in their operations and supply uranium at costs acceptable to the AEC, will find a ready market for their product, the speaker promised. However, process technology is available only to persons cleared under the Atomic Energy Act, he reminded.

The triple objective of gaining uranium production, production of higher analysis fertilizer and the maintenance of existing distribution facilities can be attained, the speaker summarized.

Looking ahead to an increase in U. S. population and the corresponding necessity for production of more plant foods, Mr. Wimpfen stated that at least 3 million tons of P_2O_5 will be required by 1960 to supply the crop demand. In view of the sulfur situation and its effect on production of P_2O_5 , the AEC is conducting experiments on means of recovering uranium by nitric acid acidulation.

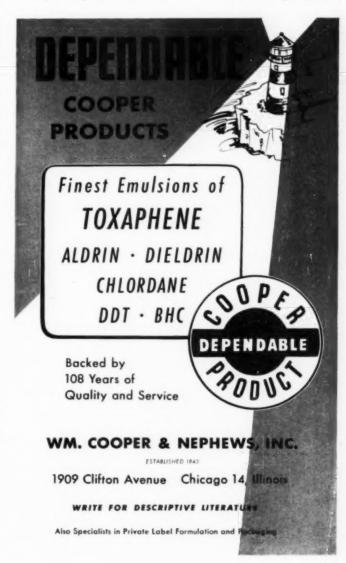
A question and answer period following the talks by government representatives, shed further light on what had been said. Questions covered CPR-22, sulfur supplies, use of nitric acid and construction of new manufacturing facilities. One ques-

tioner asked if any arangements have been made to reduce "out of pocket" freight rates. The answer was, "none yet." Another inquirer wanted to be sure his company had to come under CPR-22 by December 19, to which Mr. Gran replied affirmatively.

Another question regarding the new tailored order, asked if the order will designate exact grades of fertilizer to be sold in any given area. The answer was, that this matter is quite complicated due to there being no limit upon the number of grades. Consequently, it appears that it will be difficult to designate exact grades.

Regarding the extraction of uranium from triple superphosphate, the question was asked about how much more triple might be available. Mr. Wimpfen replied that new additions to existing plants may total a hundred thousand tons, P₂O₅, in addition to new plants being built.

In answer to a question about



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PENNSYLVANIA

increasing production of phosphoric acid, it was stated that the U. S. Department of Agriculture and the TVA were cooperating to work this out. It was also asked whether nitric or other acid can extract uranium from phosphate. The answer was that it can be done technically, but not economically, since the cost is too high in most cases.

Mr. Porter was asked if any new mixing plants are to be allowed. He replied that there are still many plants not operating at full capacity, and that it would be better to utilize this source of additional supply rather than expending needed materials for new installations.

Preceeding the annual NFA banquet Tuesday evening, Ashcraft-Wilkinson Company, Atlanta, gave a cocktail party in the Biltmore's Crystal Lounge. The banquet itself was presided over by J. E. Totman and J. Rucker McCarty, chairman of the hospitality committee Entertainment consisted of a magician team, a group of dancers and an impersonator. The NFA estimated an attendance of nearly 500 at the banquet.

DUST HAZARDS

(Continued from page 35)

also suitable for gases, vapors, mists or dusts produced by handling of the other organic phosphates. In dusting or spraying insecticides from aircraft, pilots should be equipped with a gas mask rather than respirators.

There are many technical factors involved in the proper design of respiratory protection equipment. Exhalation and inhalation valves are usually included to assure in breathing only through the filter, and to permit by-pass of the filter during exhalation. Since the most harmful particles are those so small that they cannot be seen by the naked eye, usually falling within the range of from 1/2 to 10 microns in diameter, (a micron is approximately 1/25,000 of an inch) the porous mat of mechanical filters must be of precise design to retain these very tiny particles and yet, permit adequate

air to flow through the interstices, so that it is not uncomfortable to breathe through the respirator.

The official approval agency for personal respiratory protective devices is the United States Bureau of Mines, which tests equipment under rigid schedules before issuing an approval certificate. In addition, the U. S. Department of Agriculture has set up test specifications and tests for respiratory protective equipment to be used when applying toxic in-

secticides. It is important that prospective users be aware of these facts and be certain that only approved equipment is provided.

The manufacturers of agricultural chemicals have joined forces with the Department of Agriculture, the Public Health Service, and safety equipment manufacturers in the drive to acquaint the users of their products with the dangers inherent in their improper use. With the introduction of new compounds added



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Marietta's Air-Cell construction keeps out moisture. reduces spoilage, keeps fertilizers and bulk materials BONE DRY!

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of hundreds of tip sizes for any type of spraying. Only
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 Easy tip adjustment on all flat spray tips. Milled flat tip surfaces are parallel to plane of the flat spray.

SPRAYING SYSTEMS CO. 3230 RANDOLPH STREET ILLINOIS BELLWOOD .

Teelet Spray Nozzles are made for use with all types of spraying equipment. Write for Bulletin 58.

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MUL-SI-MO is especially adapted for the rapid emulsification of Oils whose viscosity is 120 Saybolt or issa.

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Mul-si-mo is a thin amber-colored oily liquid about the same viscosity as Kerosene Oil.

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There is nothing complicated about the use of Mul-si-mo. It is just poured into the oil to be treated at the rate of ½ to 1%, depending upon the tightness of emulsion desired—then thoroughly stirred—and the process is completed.

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A practically 100% Oil Product—No water—No Scap—No Potash ner other Alkalines.

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Mul-si-mo, we believe, is the cheapest and most economical Emulsifier on the market for the emulsification of the oils above specified.

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Extensive tests have shown
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of half-gal. to 100 gals, water,
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Per Gallon \$4,00; 5 Gallons
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Gallon Drums @ \$3.50 per Gallon, f.o.b. Neso York or Jersey
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address all communications to 25 Paulus Boulevard, New Brunswick, N. J. to the increasing use of present products, this campaign must continue apace, so that the progressive farming era made possible by improved agricultural chemicals may be a safe, as well as a productive one.

BHC TAINT

(Continued from Page 33)

Winter moth and other caterpillars - Opheroptera brumata,

Monima incerta, Hubernia defoliaria, Cacaecia podana etc. Aphids - Anuraphis roseus, Aphis pomi etc.

Apple sucker - Psylla mali

Apple capsid Plesiocoris rugicollis

Woolly aphis - Enosoma lanigerum

Apple sawfly - Hoplocampa testudinea

Fruit tree red spider - Oligonychus ulmi

Codling moth · Cydia pomonella

The conventional treatments against this range of pests hitherto have been the use of tar and/or petroleum emulsions during the dormant season, or DNC/oil washes in the delayed dormant period, to control aphis, sucker and to some extent capsid and red spider, followed by lead arsenate to control caterpillars; nicotine or derris for the control of sawfly, followed by lime-sulphur or derris for red spider; and lead arsenate again for second brood codling moth. Some difficulty was always experienced in the control of apple blossom weevil, woolly aphis and sawfly.

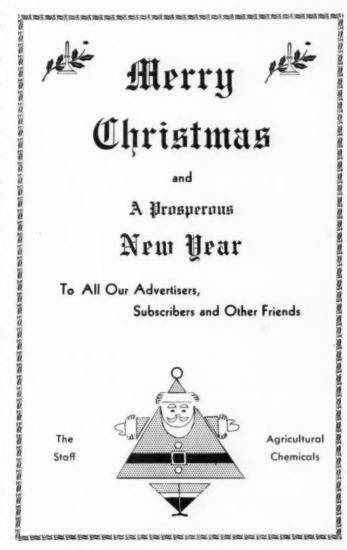
With the advent of DDT, the apple blossom weevil problem was solved and this insect is no longer a major pest in the fruit orchards of Britain. Following up this lead our own work has concentrated more on BHC than on DDT and we have found that, using a dispersible powder formulation containing 50 per cent BHC, itself containing a minimum of 13 per cent gamma-BHC, we can now control a wider range of these insects than with any other

alternative program available.

The complete spraying program currently recommended is:-

| 1 lb. 50 BHC p 100 ga | er | Stage o | | Insects ntrolled |
|-----------------------------|--------|------------|-----|---------------------|
| 4 | | burst' | | Blossom |
| 4. | 'Gree | en cluster | | rpillars, |
| 4 | 'Pink | bud' | Cap | sid and |
| 2 - 3 | 'Petal | fall | | le sawfly |

It seems inappropriate here to give many tables of confirmatory data, but as apple sawfly was for many years our most difficult pest, because timing of the then available insecticides was so critical, I would select a typical result with this insect from our 1950 records. The 50 per cent BHC dispersible powder was applied at 4 lb. per 100 gallons at 'green cluster' and at 2 lb. at 'petal fall,' the latter being the effective application. The sawfly counts were taken on June 10th, with the following results:-





Look here for information on development of the new synthetig insecticides.

The CHEMISTRY and ACTION of INSECTICIDES

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This new book gives a vast wealth of information on insecticides—their chemical, physical, and toxicological aspects. Helps the chemist determine their important applications and their effects upon insects. Gives history, commercial importance, major uses.

Covers these chemical groups: Arsenical Compounds; Fluorine Compounds, Sulphur Compounds; Copper Compounds; Inorganic Substances: Nicotine; Rotenone; Petroleum, Soaps, Creosotes; Synthetic Organic Insecticides.

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APPLE SAWFLY COUNTS

| Treatment | Apples Examined 2598 | Sawfly Attacked | attack 0.15 |
|----------------------|----------------------|-----------------|----------------|
| Parathion (0.005%) | 2138 | 13 | 0.6 |
| Lime sulphur (twice) | 1512 | 35 | 2.3 |
| Control | 754 | 80 | 10.6 |

In the case of woolly aphid, the timing of BHC sprays is different from the old method on the woolly colonies. The best time is just after the aphids emerge from hibernation as the days get warm. The 'green cluster' application is effective but the 'pink bud' timing is probably better. The same timing is best for apple capsid.

None of these applications shows any control of red spider mite, possibly even the reverse. This program has become possible only since the advent of the phosphorous insecticides, particularly parathion, which enables this mite to be controlled later in the season. Similarly, BHC is not efficient against codling moth and neither it nor DDT is recommended in England because of effects on parasites and predators of red spider.

The interesting part about this program is that it completely avoids any danger from taint, on apples and plums at least. In the last three seasons (up to 1950), involving experimental applications to something like 4,000 acres of commercial top fruit in Britain, there has been no instance of taint.

Summarizing our new BHC apple spraying program, I would say that it economizes labor, because it cuts out winter treatments and is applied with the fungicide wash; it is not applied to a set schedule in case the insects appear later, but is modified according to which insects prove numerous in a particular season; there is less lost time during the spring spraying; and it is cheaper than the older program.

 Slade, R.E. "A new British insecticide. The gamma isomer of benzene hexachloride."

Chem. Trade J., 116, 3017, (London, 1945) (Hurter Memorial Lecture of 8th March, 1945)

2. Jameson H.R. Thomas, F.J.D., and

Woodward, R.C. "The practical control of wireworm by gamma-BHC: Comparisons with DDT." Ann. Appl. Biol., 34, 3, September, 1947

 Jameson H.R., Thomas, F.J.D., and Tanner C.C. "The control of wireworms by gamma-BHC: The development of a seed dressing for cereals."

Ann. Appl. Biol., 38, 1, March, 1951

 Jameson H.R., and Tanner C.C.
 "Taint in potatoes grown on land treated with crude benzene hexachloride against wireworms"

J. Sci. Food Agric., 2, April, 1951

Buffalo Names Agent

Buffalo Turbine Agricultural Equipment Co. Inc., of Gowanda, New York, has announced the appointment of Wagemaker & Son, Inc., Alton, New York, as their distributors for the State of New York.

The firm of Wagemaker & Son, Inc., has two active members, W. A. Wagemaker and R. H. Wagemaker. The former has been an active distributor of sprayer and duster equipment in the State of New York for the past thirty-three years. In his capacity as distributor of the equipment manufactured by Buffalo, he will be calling on the farm equipment dealers and orchardists and farmers throughout the State.

Buffalo Turbine Agricultural Equipment Co. Inc., manufactures the Buffalo Turbine Sprayer-Duster, based on the principal of mist spraying, and also makes it possible to combine mist-spraying with dust.

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Chemical Engineer: Young chemical engineer wanted with some mechanical engineering training for production manager of independent fertilizer company in Southeast, Preferably recent college graduate. Address Box No. 590, c/o Agricultural Chemicals.

Positions Wanted

Agronomist: - Soil chemistry and fertility. Ph.D. Cornell 1951 (Nov); major, agronomy, minors, physical chemistry and plant physiology. M.Sc. in chemistry. Industrial position, research, liaison or product development. No location preferences - world wide. Married, one child. Age 28. Duncan Cameron, 114 West Buffalo St., Ithaca, New York.

Entomologist, PhD. (Major entomology; minor chemistry) desires position in any of following capacities; administrator, conductor or director of laboratory and/or field experimentation, consultant, or technical representatives. Brochure on request. Address Box No. 591, c/o Agricultural Chemicals.

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La. Fertilizer Use Rises

Louisiana farmers set an alltime record for the use of fertilizer, during 1951, according to R. A. Wasson, agronomist of the Louisiana State University Agricultural Extension Service. Mr. Wasson said that Louisiana farmers have already used 314,053 tons of fertilizer, an increase of 45 per cent over the 1950 total of 216,802 tons.

"Louisiana farmers have learned that crop yields can be materially increased by more generous use of commercial fertilizers than has been customary for most crops in the state," he stated. "Each year the Agricultural Extension Service workers in each parish conduct a vigorous educational campaign to convey to the farmers the latest fertilizer recommendations of the Louisiana. Agricultural Experiment Station."

The Extension agronomist said that of the 314,053 tons of fertilizer used this year, 169,842 tons consisted of mixed fertilizer. The remainder included 76,820 tons of nitrogen materials, 60,233 tons of phosphorous materials, and 7,158 tons of potash materials.

Walker CSC, Dies

Theodore P. Walker, former president and chairman of the board of Commercial Solvents Corp., succumbed to a heart attack in New York City on Wednesday, Nov. 28th.

Mr. Walker joined Commercial Solvents in 1922, was elected a vice-president in 1924, and a director in 1933. In 1938 he was elected president and in 1947 was made chairman of the board.



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> American Cancer Society

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TALE ENDS

THE city of Chicago, apparently in a move to protect the health and well-being of its citizens, recently placed a ban on use of DDT for producers and distributors of milk in the Illinois city. The commissioner of health threatened revocation of permits for violations, stating that the hazards from use of DDT have been greatly underestimated. We wonder what inspired the commissioner to

issue such an order particularly in view of the U. S. Department of Agriculture's advising against the use of DDT in and around dairy barns and milk plants many months ago. Could it be that some of the testimony of Dr. Biskind et al before the Delaney Committee, is just filtering down to the Chicago Health Dept?

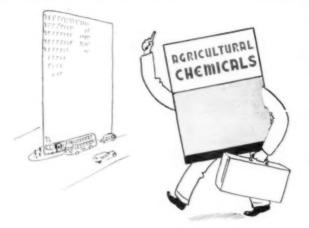
We wish it were possible to

send each and every one of our friends a personal greeting for the holiday season: This being hardly possible, we take this rather impersonal, but none-the-less sincere, method of wishing you all possible enjoyment for the current season and throughout 1952!—The Agricultural Chemicals Staff.

Dealers and salesmen selling fungicides for control of cucumber scab to New York State farmers next season may well have to anticipate rather severe sales resistance. No fungicide really worked satisfactorily on cucumber scab this past season. The reason, incidentally, as sales people will do well to point out to growers, was not anything wrong with the particular fungicide employed, but rather the generally low temperatures early in growing season, which allowed the scab to get started. Whatever fungicide was employed after the scab got well under way, generally proved unsatisfactory. Users were dissatisfied. If in 1952, however, normal temperatures prevail, the usual materials should once more provide satisfactory control.

What is the most effective control measure for dry stem on cherries, was one of the questions asked a speaker at the meeting in Ithaca last month at which control recommendations of the Cornell University Department of Entomology experts were discussed. "Pick the fruit early" was one well favored suggestion.

The idea that DDT and other pesticides are poisoning the public, is being expounded in at least some public schools. We know of one high school where the pupils are being taught the dangers of using toxicants on any growing crop, and we suspect there may be many others. A better PR program is needed by the pesticide industry.



JANUARY 1 will, we trust, find us in new quarters at the Flatiron Building, 175 Fifth Ave., New York 10, N. Y. We shall appreciate it if you will correct your records now so that correspondence, subscription renewal checks, advertising instructions, etc., will reach us at our new address.*

If you don't have anything to send us at the moment, drop us a line anyhow, just to get in the habit of using the new address. Our new postman might just as well get used to the idea, right from the start, that we get lots of mail.

AGRICULTURAL CHEMICALS

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